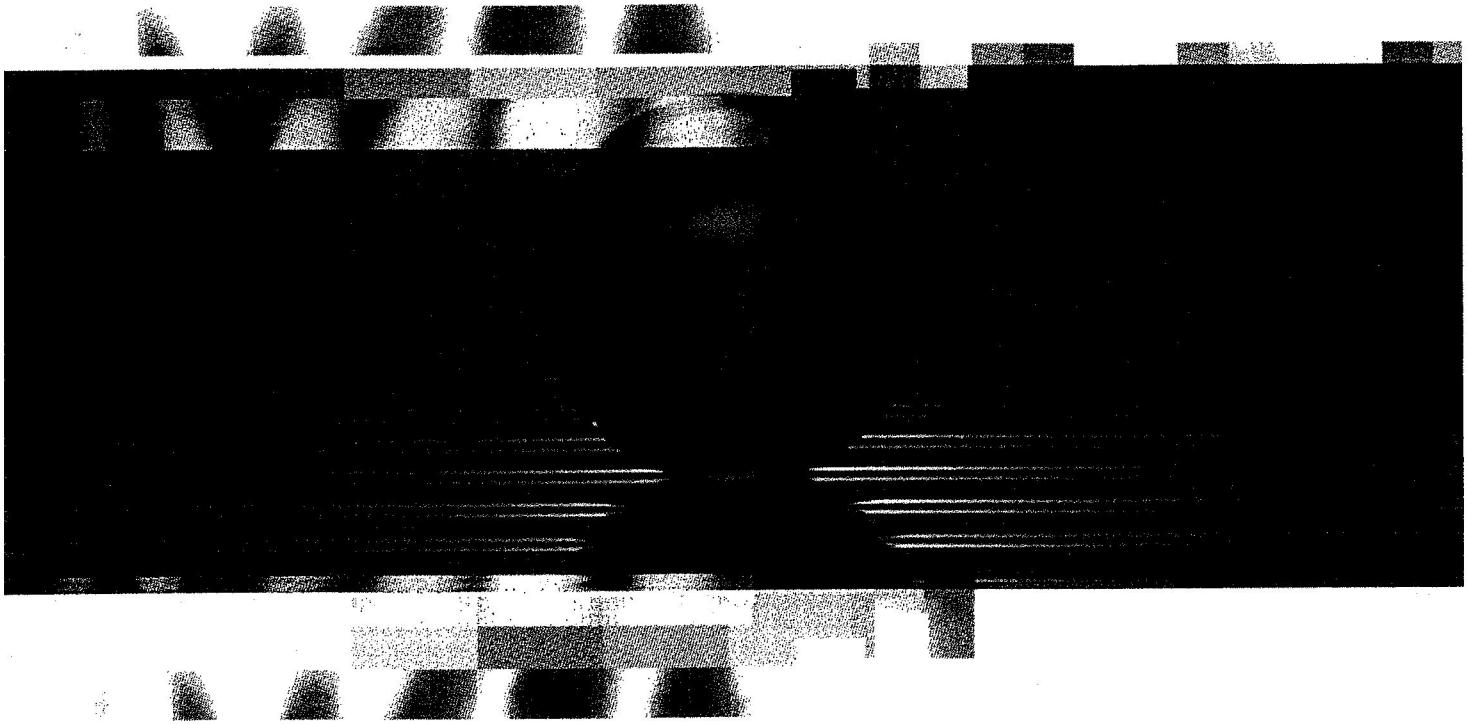
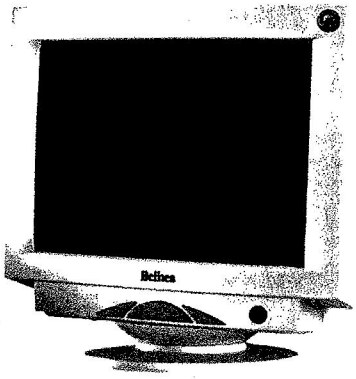
Belinea

10 20 30





Color Monitor
Service Manual

Belinea
MONITORS BY MAXDATA

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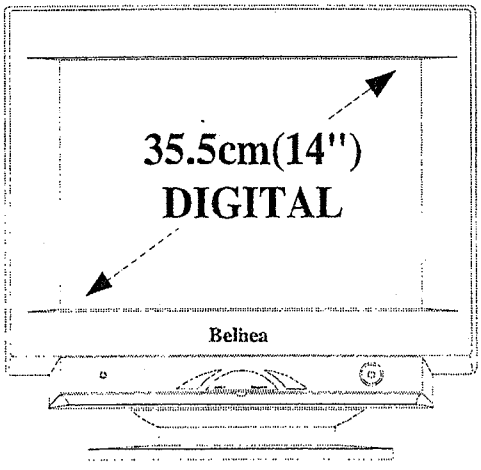
SERVICE MANUAL

15" OSD COLOR MONITOR



Belinea 102030

Belinea

By MAXDATA

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SAFETY SYMBOLS

The following safety symbols are used throughout this manual and in the instrument. Familiarize yourself with each of the symbols and its meaning before operating this instrument.

Indicate dangerous voltage is present.
Be extremely careful.

CAUTION The CAUTION sign denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in damage to or destruction of the instrument. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

WARNING The WARNING sign denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.

SAFETY PRECAUTIONS

1. CAUTION

No modification of any circuit should be attempted. Service work should only be performed after you are thoroughly familiar with all of the following safety checks and servicing guide lines.

2. SAFETY CHECK

Care should be taken while servicing this CRT display because of the high voltage used in the deflection circuits. These voltages are exposed in such areas as the associated flyback and yoke circuits.

3. FIRE&SHOCK HAZARD

3-1 Insert an isolation transformer between the CRT display and AC power line before servicing the chassis.

3-2 In servicing pay attention to original lead dress especially in the high voltage circuit. If a short circuit is found, replace all parts which have been overheated as a result of the short circuit.

3-3 All the protective devices must be reinstalled per original design.

3-4 Soldering must be inspected for possible cold solder joints, frayed leads, damaged insulation, solder splashes or sharp solder points. Be certain to remove all foreign material.

4. LEAKAGE CURRENT HOT CHECK

4-1 Plug the AC cord directly into the AC outlet. Do not use an isolation transformer during this check.

4-2 Connect a 1500 ohm, 10 watt resistor, paralleled by a 0.15uF capacitor between each exposed metallic part and a good earth ground(as shown in Fig.1).

4-3 Use an AC voltmeter with 1000 ohm/volt or more sensitivity and measure the AC voltage across the combination 1500 ohm resistor and 0.15uF capacitor.

4-4 Move the resistor connection to each exposed metallic part and measure the voltage.

4-5 Reverse the polarity of the AC plug in the AC outlet and repeat the above measurement.

4-6 Voltage measured must not exceed 7.5 volt RMS, from any exposed metallic part to ground A leakage current tester may be used in the above hot check, in which case any current measured must not exceed 5.0 milliamp. In the case of a measurement exceeding the 5.0 milliamp value, a rework is required to eliminate the chance of a shock hazard.

Note: High voltage is present when this CRT display is operating. Always discharge the anode of picture tube to the display chassis to prevent shock hazard.

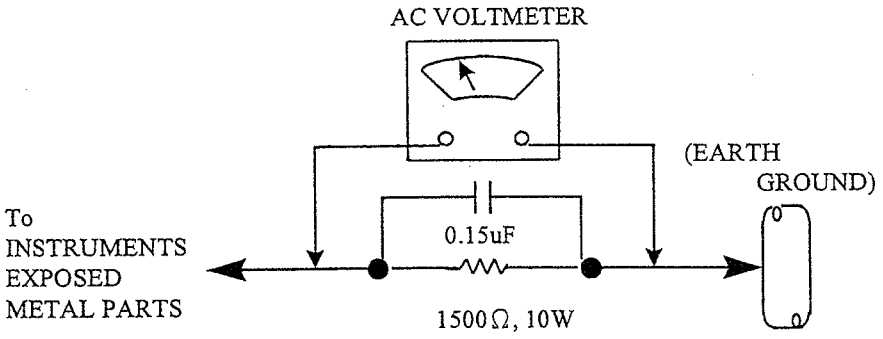


Fig.1

5. IMPLOSION PROTECTION

Picture tubes are equipped with an integral implosion protection system, but care should be taken to avoid damage and scratching during installation. Use only CPT replacement picture tubes.

6. X-RADIATION

WARNING: The only potential source of X-Radiation is the picture tube. However when the high voltage circuitry is operating properly there is no possibility of X-Radiation problem. The basic precaution which must be exercised is to keep the high voltage at the following factory-recommended level .

Note: It is important to use an accurate periodically calibrated high voltage meter.

6-1 The procedure for adjustment high voltage is as shown on (page 17).

6-2 If can not be adjust 25.0 kV at immediate service is required to prevent the possibility of premature component failure.

6-3 To prevent X-Radiation possibility it is essential to use the specified picture tube.

IMPORTANT SAFETY NOTICE

There are special components used in this CRT displays which are important for safety. These parts are identified by the international symbol ⚠ on the schematic diagram and on the replacement parts list. It is essential that these critical parts should be replaced with manufacture's specified parts to prevent X-RADIATION,shock,fire or other hazards. Do not modify the original design or this will void the original parts and labor guarantee.

FEDERAL COMMUNICATIONS COMMISION (FCC) STATEMENT

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protections against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio / TV technician for help.

Warning **A shielded-type power cord is required in order to meet FCC emission limits and also to prevent an interference to the nearby radio and television reception. It is essential that only the supplied power cord should be used.**

Use only shielded cables to connect I/O devices to this equipment.
You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

CANADIAN DEPARTMENT OF COMMUNICATIONS COMPLIANCE STATEMENT

This equipment does not exceed Class B limits per radio noise emissions for a digital apparatus, set out in the Radio Interference Regulation of the Canadian Department of Communications. Operation in a residential area may cause unacceptable interference to radio and TV reception requiring the owner or operator to take whatever steps necessary to correct the interference.

AUTOMATIC POWER SAVING DESCRIPTION

Introduction

"Green Concept" has been prevailing throughout the information market in the world these years. EPA (Environmental Protection Agency) stipulates that all information products sold to the United States should meet the requirement of environmental protection. Thus, we promote a series of monitors (102030) with power saving features which meet "EPA" energy star requirement and are also VESA (Video Electronics Standard Association) DPMS compliant.

Features

1. When monitor is powered on without connecting signal cable to PC or monitor powered on after connecting to a power off PC, the monitor will be at sleep mode. In this case, LED indication will be change to orange color.
2. When monitor signal cable is connected to a power on PC, it will stay at " on " state until PC is switched to a sleep mode or PC is powered off or monitor is disconnected to a PC. At this case monitor will automatically transfers to a power saving state and LED indication will be change to orange color.
3. When PC is recovered from sleep mode (by touching keyboard, mouse etc.) the monitor will be recovered to normal operation too.

Caution. **Power saving is applicable only if your PC provides this function.**

Mode	H-Sync	V-Sync	Power indicator	Power consumption	Recovery time
Normal	✓	✓	Green	< 90 Watt	-
Stand-by	x	✓	Orange	< 30 Watt	< 3 Sec.
Suspend	✓	x	Orange	< 15 Watt	< 3 Sec.
Off-State	x	x	Orange	< 5 Watt	< 10 Sec.

Note **DPMS is a Display Power Management Signaling standard proposed by VESA committees.**

SPECIFICATIONS

1. This section provides an overview of the numberous functions and features of your SUPER-VGA monitor.

2. Mechanical Description

DIMENSIONS	(Set Size)	(Carton Size)
Height:	368 mm	415 mm
Width:	362 mm	457 mm
Depth:	385 mm	485 mm

WEIGHT		
Net Weight:	13 Kg	Gross weight: 15 Kg

TILT / SWIVEL BASE	
Tilt Range:	+15° / -5°
Swivel Range:	± 45°

3. Display Tube Characteristics

Size:	15" (14" inch view able) with 3 to 4 aspect ratio, 90°, 29.1mm neck.
Dot Pitch:	0.28 mm
Gun:	In-line
Surface/Transmission:	Non-glare, Dark tinted, F.S. tube with antistatic, anti-reflection coating..low emission according to MPR II and TCO 1995
Phosphorus / Persistance:	P22 / Medium Short

4. Electric Performance

1) Power Supply

Input Voltage:	AC 110-230V
Input Frequency:	60+/- 3 Hz / 50+/- 3 Hz
Input Current:	1.5A max (110-230VAC)
Consumption:	90 W max

2) Input Signals

Video Signal:	Red / Green / Blue. All are positive analog.
Input levels:	0-0.7 Vp-p (max.)/75 ohm

3) Synchronization

30 - 70KHz Horizontal
50 - 120Hz Vertical

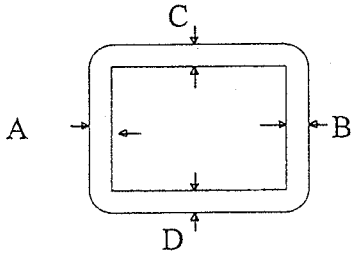
4) Resolution: 1152 x 864 pixels Non-Interlaced

5) Band width: 86 MHz

6) Display Color: Analog input Unlimited colors.

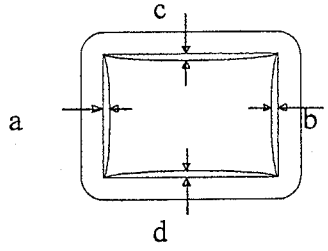
7) Display Size:
Horizontal: 260 mm typical
Vertical: 195 mm typical

8) Image Position:



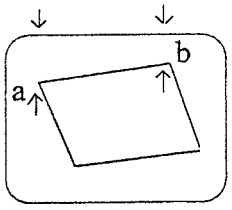
Hori. 260± 6mm
Vert. 195± 6mm
Hori. off set | A-B | ≦ 6mm
Vert. off set | C-D | ≦ 6mm

9) Distortion:
A) Pincushion



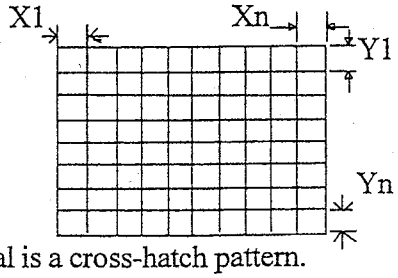
a, b ≦ 2.0mm
c, d ≦ 1.5mm

B) Tilt



|A - B| ≦ 1.5mm
|C - D| ≦ 1.5mm
Input Signal ---- Cross - Hatch

C) Linearity



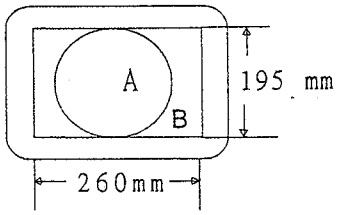
Note: Input Signal is a cross-hatch pattern.

Calculation: H/V-lin

$$= \frac{\text{Maximum-Average}}{\text{Average}} \times 100$$

Primary Modes
Horizontal Linearity ≦ 5%
Vertical Linearity ≦ 5%
H/V Linearity ≦ 9% for 43KHz
Secondary Modes
Horizontal Linearity ≦ 7%
Vertical Linearity ≦ 7%
Pattern 10x 8 Cross hatch pattern

10) Misconvergence:



A Zone ≤ 0.3 mm
B Zone ≤ 0.4 mm

11) White Balance:
x= 0.281 +/- 0.02
y= 0.311 +/- 0.02

12) Environmental Conditions:

Operation:	5° C to 35° C ambient
Humidity:	8 % to 85% (non-condensing)
Heigh:	3000m
Storage:	-40°C to 70° C (packed)

13) User Controls:
Front: OSD menu selected (Brightness , Contrast Horizontal position , Width ,Vert. position , Height , Pincushion , Trapezoid , Rotation , Language , Recall , Escape , Degauss).

14) Signal Connector: 15-pin mini D-Sub Male Connector

15) Approvals:
-Safety approvals
EN60950 and ZH 1/618 (TUV/GS Mark)
CUL

-Powermanagement
VESA DPMS
EPA power management
Nutek
TCO 95

-X-Ray
ROV 1987
FDA DHHS 21CFR Subchapter J

-Radiation
MPR II 1990-10
TCO 95

-EMI
CE(EN 55022/B, EN 50082-1 and Low Voltage Directive '97)

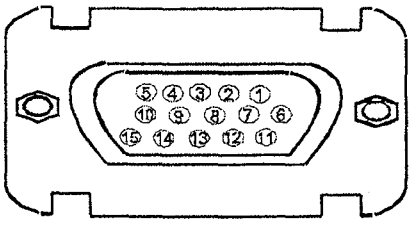
-FCC class B

GENERAL CONNECTION & APPLICATIONS

-Ergonomic
TUV Ergonomic (MPR II, ISO9241-3)
ISO 9241-8
ISO9241-7
ZH 1/618
TCO95

16) PIN ASSIGNMENT

Front view
(Pin side)



PIN	SIGNAL
1	RED
2	GREEN
3	BLUE
4	GROUND
5	TEST
6	RED GROUND
7	GREEN GROUND
8	BLUE GROUND
9	NO PIN
10	GROUND
11	GROUND
12	SDA
13	HOR. SYNC
14	VERT. SYNC
15	SCL

LOADING & UNLOADING THE TILT/SWIVEL BASE

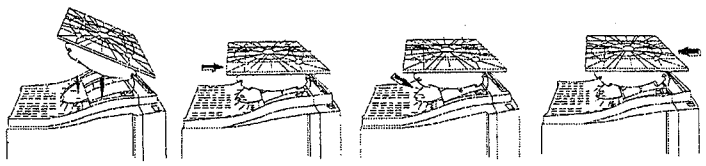
LOADING

1. Align the feet on the optional T/S base with the arrow-marked openings on the bottom of the monitor cabinet.

2. Slide the T/S base in the direction of the front panel until you hear a "Click". The T/S base is now secured in position.

UNLOADING

Gently press at the clip with one hand, while pulling the T/S base towards the rear of the cabinet with the other hand. The T/S base should now come off of the monitor.

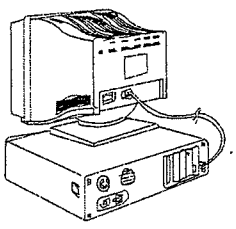


Loading T/S Base Unloading T/S Base

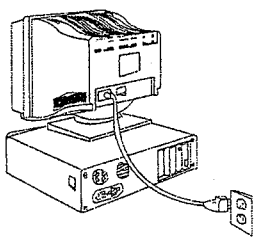
CONNECTING THE SIGNAL CABLE & THE POWER CORD

1. Plug the 15-pin signal cable connector into the video signal connection located at the rear panel of the system. Tighten the two screws on the cable connector.

2. Connect the power cord either into a AC outlet or into your computer's inlet. If the AC outlet in your location does not provide for this type of grounding plug, have the proper adapter installed for safe grounding.



Signal Cable between Monitor and PC



Power Cord to AC Outlet

PICTURE ADJUSTMENTS USING THE OSD MENU

1. **Power Switch**
   This turns the power on and off. Press to turn the power, press again to turn the power off.

2. **Pilot Led**
   When power is turned on, the lamp lights green; when the unit goes into power management off modes, the light turns to orange.

3.4. Operator Key

These keys are used for screen adjustment. Detail explaination as shown (figure1).

①Adjustment menu icons, sequentially by pressing ENTER/EXIT keys and adjusting shuttle left or right direction.

②The item presently being adjusted shown.

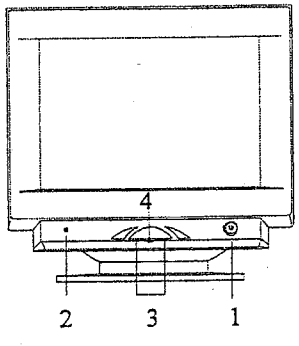
③This displays are input synchorization signal frequency.

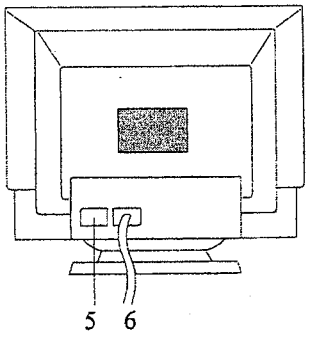
④The adjustment level by pressing ENTER/EXIT keys and adjusting shuttle left or right direction.

The adjusted items are represented by icons when the icons are selected, the color of according icon will turnred.

5. **AC Inlet**
   Connect the power cord.

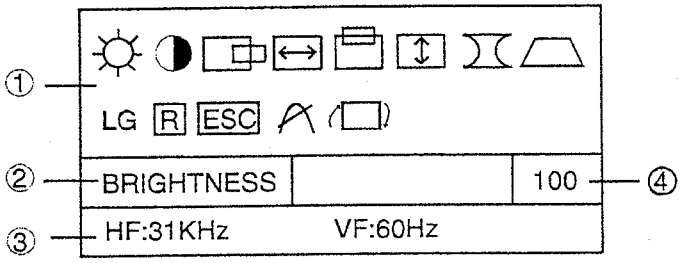
6. **Video Cable**
   To the computer video output.





PICTURE ADJUSTMENTS USING THE OSD MENU

OSD Menu Icons



(Figure 1)

Symbol	Function	Process
	Brightness	Controls the picture brightness
	Contrast	Controls the picture contrast
	Horizontal position	Controls the horizontal position
	Width	Sets the picture width
	Vertical position	Controls the vertical position
	Height	Sets the picture height
	Pincushion	Eliminates pincushion distortion
	Trapezoid	Eliminates trapezoid distortion
	Rotation	Adjust the image so that it is as horizontal as possible
LG	Language	Selects the desired language
R	Recall	Recalls factory preset values
ESC	Escape	Switches off the OSD menu; any changed settings will be stored
	Degauss	When the monitor is rotated or moved, after you have selected the icon, press one of the OSD setting buttons ⊖ / ⊕ to activate the function. You should always wait at least 20 minutes before repeating this funciton.

ADJUSTMENT PROCEDURES

Check the monitor according to the *Inspection Standards* and, if necessary, follow the procedures below to adjust the monitor.

1. Power Supply

   a. Input Voltage : AC110V ~ AC230V.
   b. Input Frequency : 60 +/-3Hz / 50 +/-3Hz.

2. Note

   a. Turn the monitor so the screen of the CDT faces eastward.
   b. Before adjustments, warm up the monitor for 30 minutes.
   c. Mode setting refer to table 1

3. Control Confirmation

   a. The 800× 600 54K mode signal will be used to check all display modes of the monitor.
   b. To adjust the monitor, set the brightness control to its raster cut off position and the contrast control to its maximum position.

4. Adjustment Equipment (for reference only)

   a. Degaussing Coil
   b. Convergence gauge " Klein" or Minolta CC-100
   c. Digital Voltmeter (Model: Fluke 8050A or equivalent)
   d. Colour Analyzer (Model: Minolta TV-2130 or CA-100)
   e. Ruler (30 cm)
   f. High - Voltage Probe (Model: Fluke 80K-40)
   g. PC system for DDC data check
   h. Chroma (Model: 1000, 2000 o r 2130, 2135)
   i. Power meter (model : 2533 or equivalent)
   j. Tool-1uF 50V NP capacitor
   k. Screw driver "-" & "+"
   l. Hipot tester

Parameters of Signal Timing Generation

Timing	1	2	3	4	5	6
Standard	Industry	Industry	VESA II	VESA II	VESA II	VESA
Data Pixel	640	640	640	800	1024	640
Data Line	400	480	480	600	768	480
H-Freq kHz	31.469	31.469	37.500	46.875	60.023	43.269
V-Freq Hz	70.087	59.942	75.000	75.000	75.029	85.008
Pix Rate	25.175	25.175	31.500	49.500	78.750	36.000
Hor.A (us)	0.636	0.636	0.508	0.323	0.203	1.556
Hor.B (us)	3.813	3.813	2.032	1.616	1.219	1.556
Hor.C (us)	1.907	1.907	3.810	3.232	2.235	2.222
Hor.D (us)	25.422	25.422	20.317	16.162	13.003	17.778
Hor.E (us)	31.778	31.778	26.667	21.333	16.660	23.111
Vert.A (ms)	0.381#	0.381	0.027	0.021	0.017	0.023
Vert.B (ms)	0.064	0.064	0.080	0.064	0.050	0.069
Vert.C (ms)	1.112#	1.048#	0.427	0.448	0.466	0.578
Vert.D (ms)	12.711	15.253	12.800	12.800	12.795	11.093
Vert.E (ms)	14.269	16.683	13.333	13.333	13.328	11.764
Sync.Pol	-/+	-/-	-/-	+/-	+/+	-/-

Timing	7	8
Standard	VESA	VESA
Data Pixel	800	1024
Data Line	600	768
H-Freq kHz	53.674	68.667
V-Freq Hz	85.061	84.997
Pix Rate	56.250	94.500
Hor.A (us)	0.569	0.508
Hor.B (us)	1.138	1.016
Hor.C (us)	2.702	2.201
Hor.D (us)	14.222	10.836
Hor.E (us)	18.631	14.561
Vert.A (ms)	0.019	0.015
Vert.B (ms)	0.056	0.044
Vert.C (ms)	0.503	0.524
Vert.D (ms)	11.179	11.183
Vert.E (ms)	11.756	11.765
Sync.Pol.	+/+	-/-

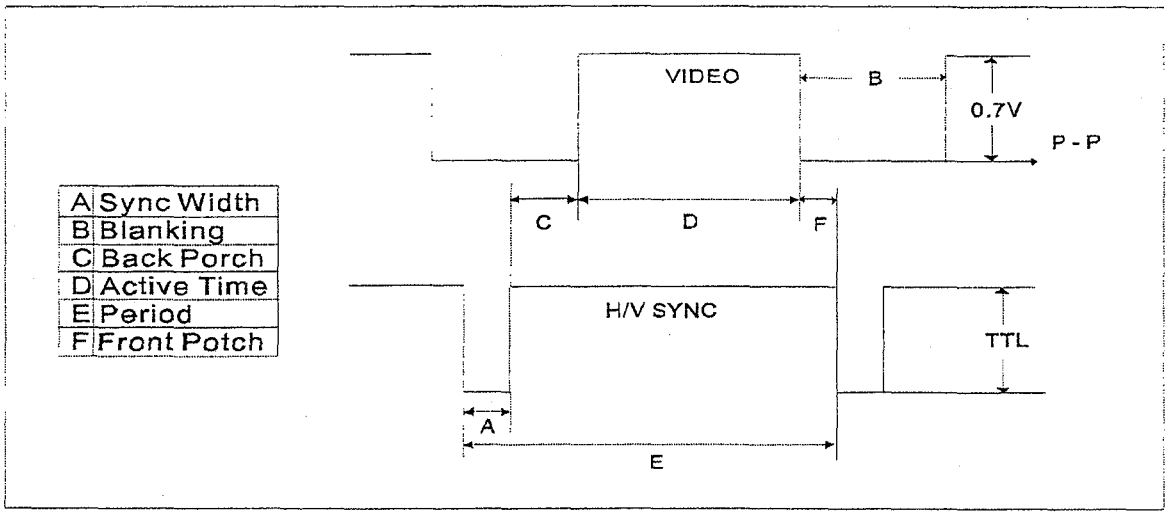

A Sync Width
B Blanking
C Back Porch
D Active Time
E Period
F Front Potch
VIDEO
B
0.7V
P - P
C
D
F
H/V SYNC
TTL
A
E

Table 1 for mode setting

Mode	Card Item	Freq. H. KHz	Freq. V. Hz	Resolutions
1	Industry	31.5	70.08	640 x 400
2	Industry	31.5	60	640 x 480
3	VESA	37.5	75	640 x 480
4	VESA	43.3	85	640 x 480
5	VESA	46.9	75	800 x 600
6	VESA	53.67	85	800 x 600
7	VESA	60	75	1024 x 768
8	VESA	68.68	85	1024x 768

6.Disassembling and Assembling the monitor's tilt/swivel base

a. Place the monitor upside down on a soft surface (pillow, blanket or similar object).

b. Grasp the tilt/swivel base on the front and back and firm-ly lift the locking tab with your index finger (step 1 in figure 1).

c. Then, push the bowl of the tilt/swivel base to the back of the monitor until it comes free of the fastening (step2 in figure 1). This may require some force.

Store the tilt/swivel base for later use! If you need to reas semble it , follow the same steps in reversed order. Make sure the locking tab snap shut secuely.

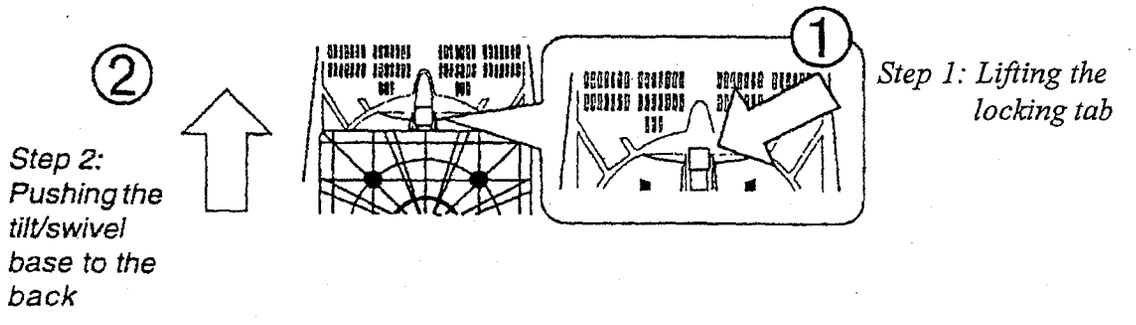
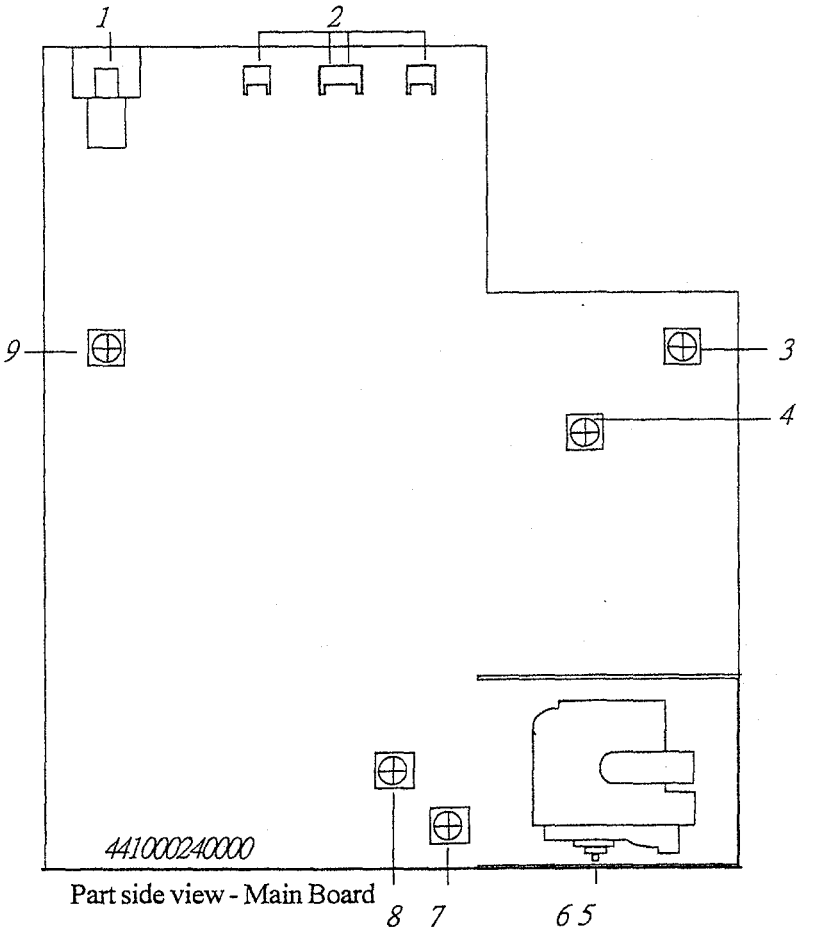


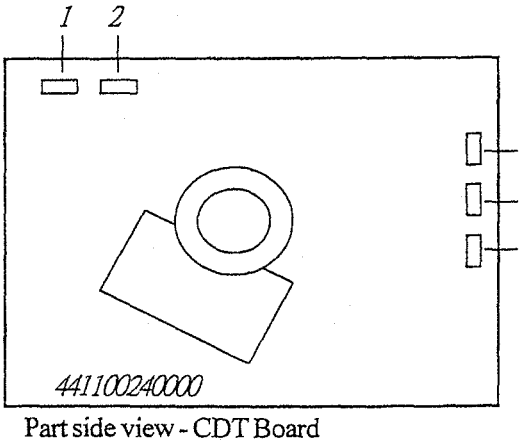
Figure 1 locking tab of the tilt/swivel base

7. Service Adjustment Control Locations:



Part side view - Main Board

1. Power switch (SW101)
2. OSD Function key
   Menu (SW601)
   ACB (SW602)
   Enter (SW604)
3. V.Line (VR301)
4. Parallel (VR403)
5. Focus
6. Screen
7. ABL (VR405)
8. H.V. (VR001)
9. B+12V(VR151)



Part side view - CDT Board

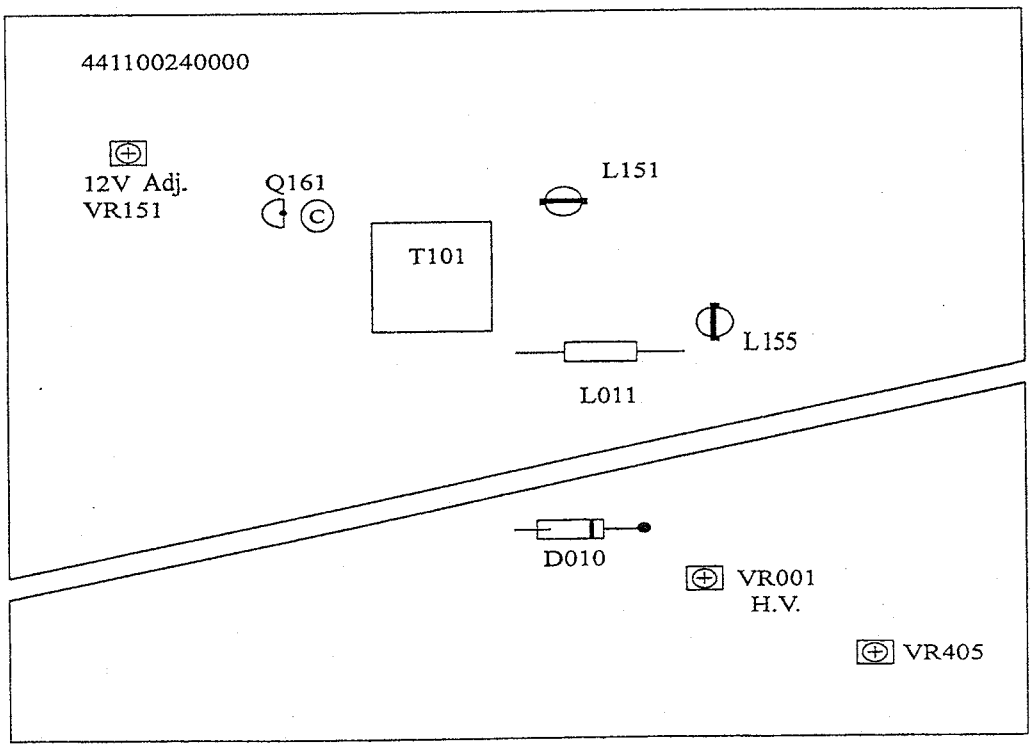
1. *R .Drive (VR201)*
2. *G.Drive (VR221)*
3. *B.Cut-Off (VR541)*
4. *R.Cut-Off (VR501)*
5. *G.Cut-Off (VR521)*

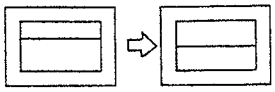
8. Adjustment

a. B+ Voltage Adjustment :

- Apply the mode 3 signal with a full white pattern.
- Apply 220V AC to the unit.
- Set the Brightness and the Contrast to the Max., the size to 260x 195mm.
- Put the DVM probe between Q161ⓒ cathode and GND.
- Adjust the VR151 until 12 VDC +/- 0.1V.
- Confirm the voltage across the L011 to be 62.5 VDC + /- 2V.
- Confirm the voltage across the L155 to be 21 VDC +/- 1V.
- Confirm the voltage across the L151 to be 6.3 VDC +/- 0.2V.
- Put the probe between the D010 cathod and GND.
- Adjust the VR001 until 67.5 VDC± 0.5V.
- Comfirm the voltage across the C153 to be 86 +/- 2V.

Parts side view

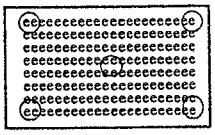




b. V. Line Adjustment:
- Apply the mode 9 signal with a 10x8 crosshatch pattern.
- Adjust the VR301 to equalize the length of each square from the center to the top edge and from the center to the bottom edge.

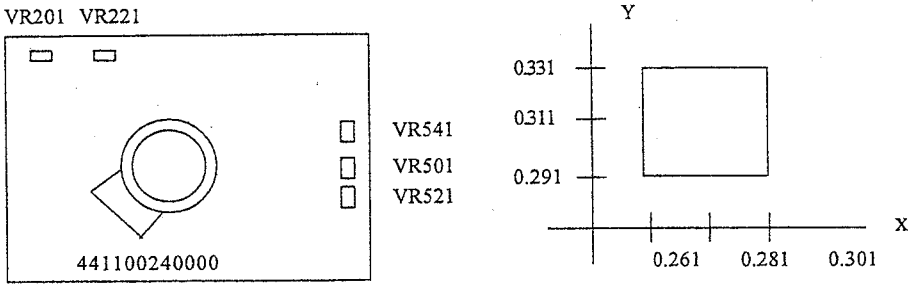
c. X-Ray Protection Test:
- Short TP402 and TP404(Install 3k ohm tool), Check if the protection circuit works.
- Remove the tool and Restart the unit.

d. Focus Adjustment:

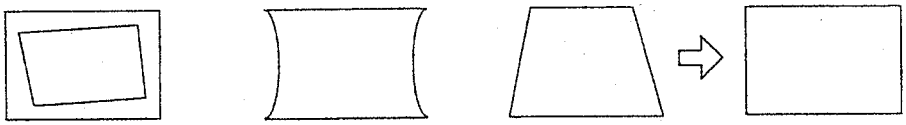


- Apply the mode 6 signal with the text pattern.
- Set the brightness and contrast to the raster just disappears.
- Adjust the focus VR (on the FBT) until the letter "text" appear (at five point) to its clearest.

e. White Balance Alignment: (Warm Up 30 Minutes)
- Degauss the screen using the degaussing coil.
- Apply the mode 3 signal with the video cut off pattern.
- Set the contrast to the max., and the brightness to the max. (at exterior)
- Put the color analyzer probe on the screen center, adjust the screen VR (G2) (on the FBT) until the "Y" is 0.4~0.6 Ft-L.
- Adust the VR541 to center position , adjust the VR501 and the VR521 until "x" = 0.281 and "y" = 0.311 +/-0.005 (the "Y" must be in 0.4~0.6 Ft-L range)
- Adjust the screen VR (on the FBT) again if it is out of range.
- Apply the white- square- box pattern (50mm x 50mm).
- Set the contrast and the brightness to the max.
- Adjust the OSD control key (at exterior) of the sub-contrast in 45 Ft-L +/- 10 FL range.
- Apply the mode 6 signal (full white screen).
- Put the color analyzer probe on the screen center, adjust the contrast until "Y" = 10 Ft-L.
- Adjust the VR201 & the VR221 until "x" = 0.281 and "y" = 0.311+/-0.005.
- Confirm the reading by setting the contrast from 5-20 Ft-L, make sure that the reading is within ("x" = 0.281 and "y" = 0.311 +/- 0.010) range.



f. Trapezoid & Pincushion & Rotation Adjustment:
- Apply the all mode signal with a crosshatch pattern.
  Adjust the OSD control key (at exterior).
- Adjust the V-Size to be 195 mm and adjust V-Phase to be centered.
- Adjust the H-Width to be 260 mm and adjust the H-Phase to be centered
- Adjust the Pincushion for the best result.
- Adjust the Trapezoid for the best result (at the rear cover).
- Adjust the Rotation for the best result.



Rotation Pincushion Trapezoid

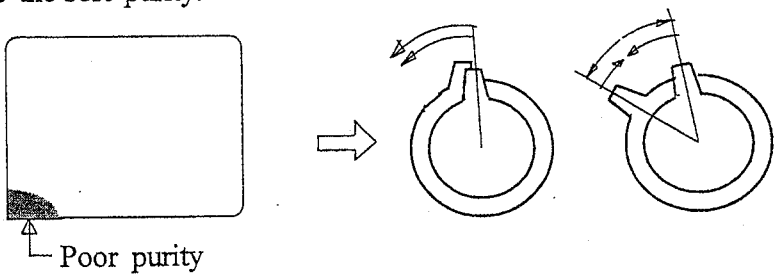
g. Size, Phase, Pincushion, Interlace, H-Linearity, V-Linearity, Rotation and QC Check:
- Apply the all mode signal with a crosshatch pattern.
- Set the H-Phase to 260 mm, the V-Phase to 195 mm. Check mode 1-9 if the size is off by +/- 6 mm, the pincushion +0.5 mm and -2 mm range, Rotation +/- 1 mm.

h. Power Saving Test:
- STANDBY MODE: Open the H-Sync, check if the power is under 15 W.
- SUSPEND MODE: Open the V-Sync, check if the power is under 15 W.
- OFF MODE: Open the H-Sync and V-Sync, check if the power is under 5W.

PURITY & STATIC CONVERGENCE ADJUSTMENT

a. Purity Adjustment:

- Warm up the monitor for 30 minutes before performing this adjustment.
- Loosen the PCM (Purity ,Convergence ,Magnetic) assembly.
- Clean the glue off the magnetic assembly (After adjustment, fix the assembly with
  glue again.)
- Degauss the CDT with a degaussing coil.
- Turn the contrast and brightness controls to their maximum position.
- Apply a full-green pattern signal.
- Align the long and short purity magnets until a zero magnetic field is produced.
- Rotating the 2-pole magnets to the full-green colour on the screen.
- Recheck with full-red and full-blue pattern signals. Re-adjust the 2-pole magnets to assure the best purity.



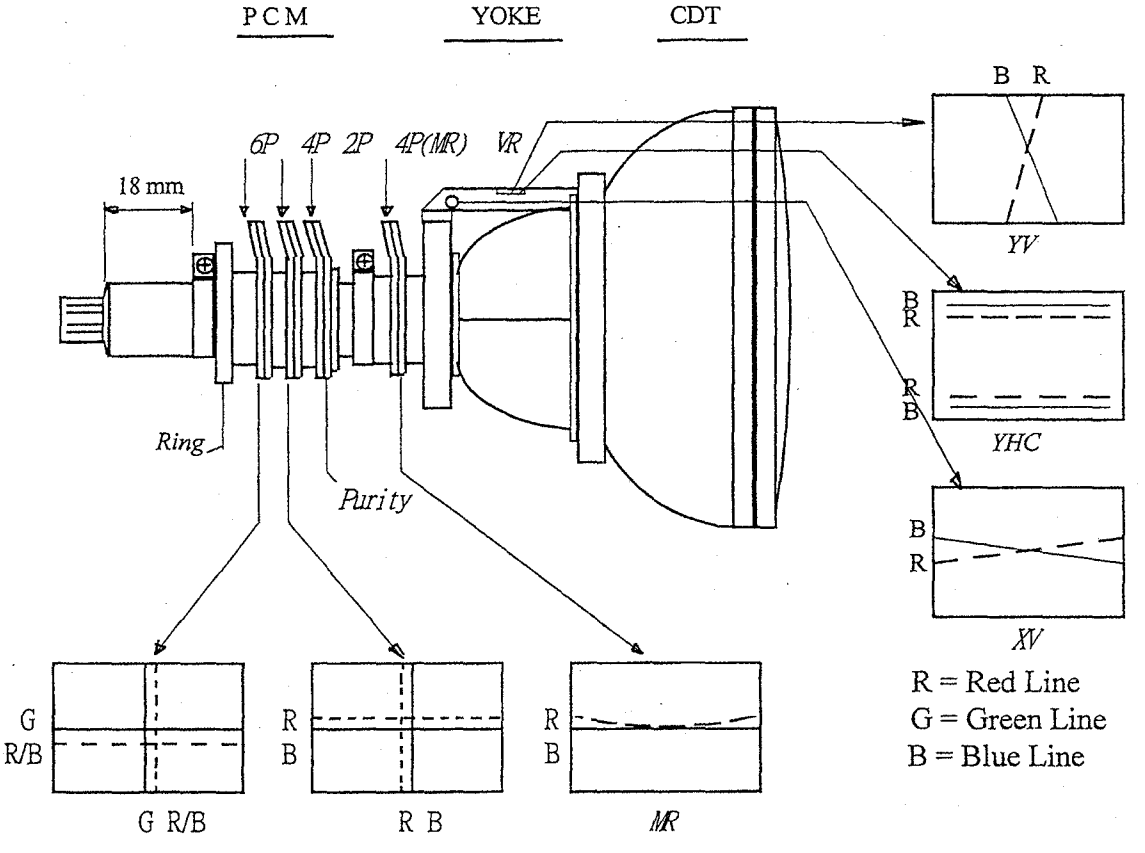
b. Static Convergence Adjustment:

- Apply a cross hatch pattern signal.
- Turn the brightness and contrast controls to the center position.
- The 4-pole magnets are used to adjust the static convergence. Rotate the magnets until the red and blue lines become one purple line. Rotating the 6-pole magnets will cause the purple and green lines to converge. (Dynamic convergence is adjusted by moving the yoke as described in section c.)

Note:

- Warm up the monitor 30 minutes and the CDT must faces east.
- Degauss the display fully by using an external degaussing coil.
- Before adjusting the convergence, the vertical size, the horizotal width , and the focus adjustment must be complete

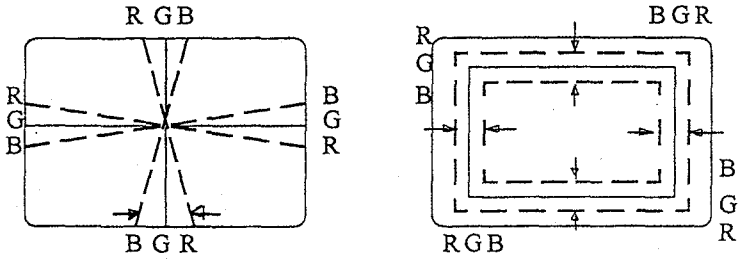
1. Apply red and blue cross-hatch pattern signals.
2. The red and blue lines are converged by turning the two tabs of the 4-pole magnets.
3. Apply a cross-hatch pattern of green lines. Adjust the convergence of the purple and green colours by turning the two tabs of the 6-pole magnets.
4. Repeat these steps until the best convergence of red, green and blue has been obtained.
5. Due to the interaction among the magnets, there may be a need to repeat the adjustment.



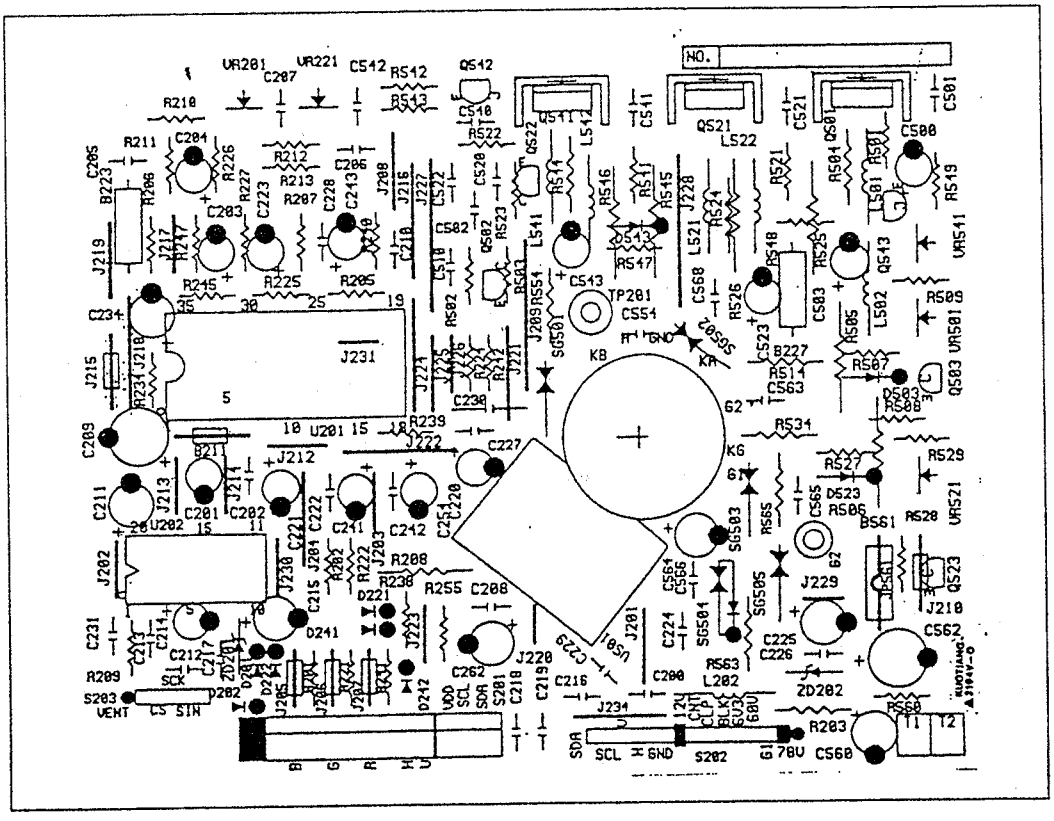
c. Dynamic Convergence Adjustment:

Note: Rubber inserts are necessary to adjust dynamic convergence.

- Put two rubber inserts between the yoke and the funnel of the CDT. Fix them temporarily.
- Move the yoke up or down to get the best dynamic convergence, and then fix the yoke by pushing the rubber inserts between the yoke and the funnel.



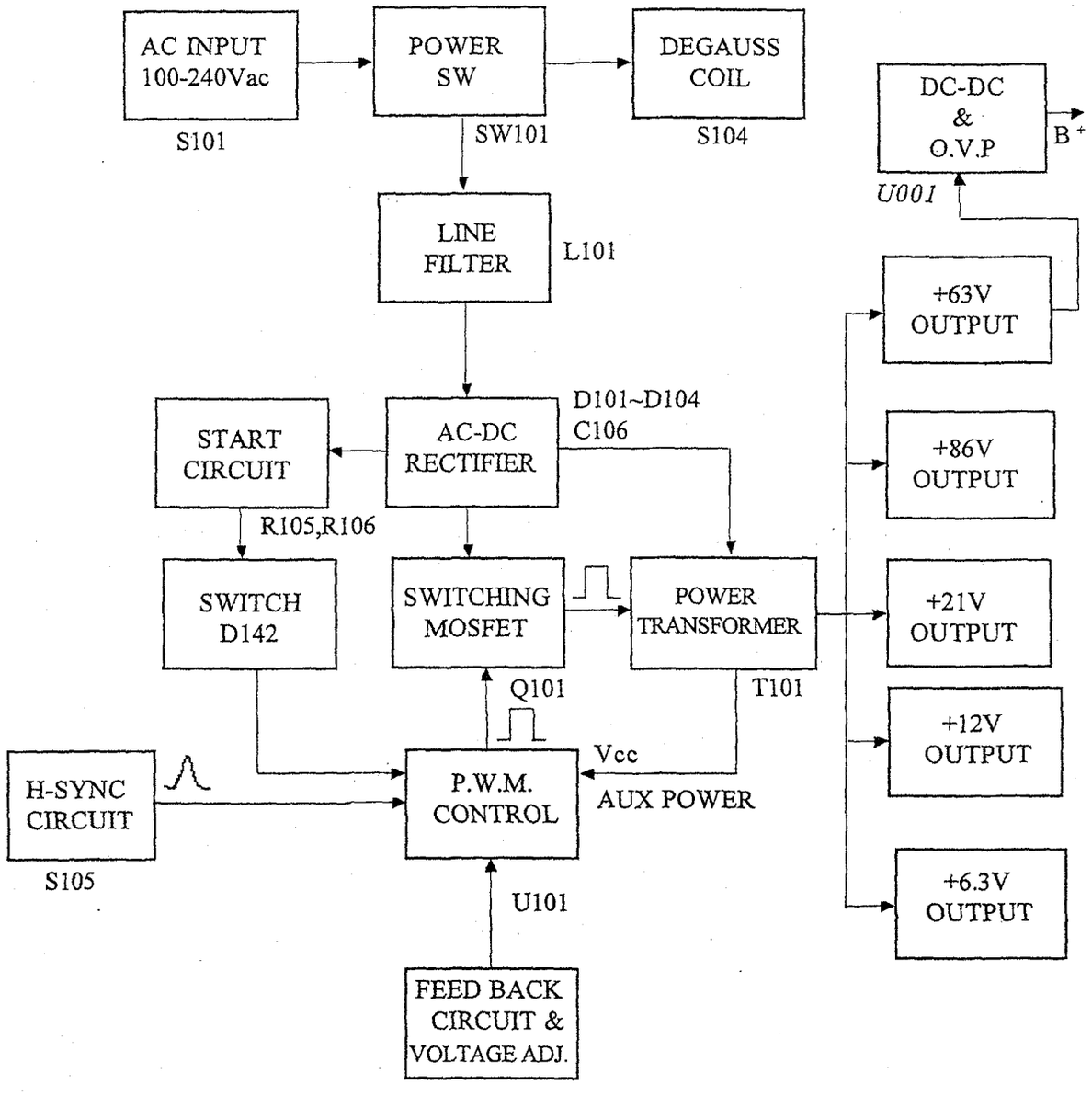
PCB LAYOUT



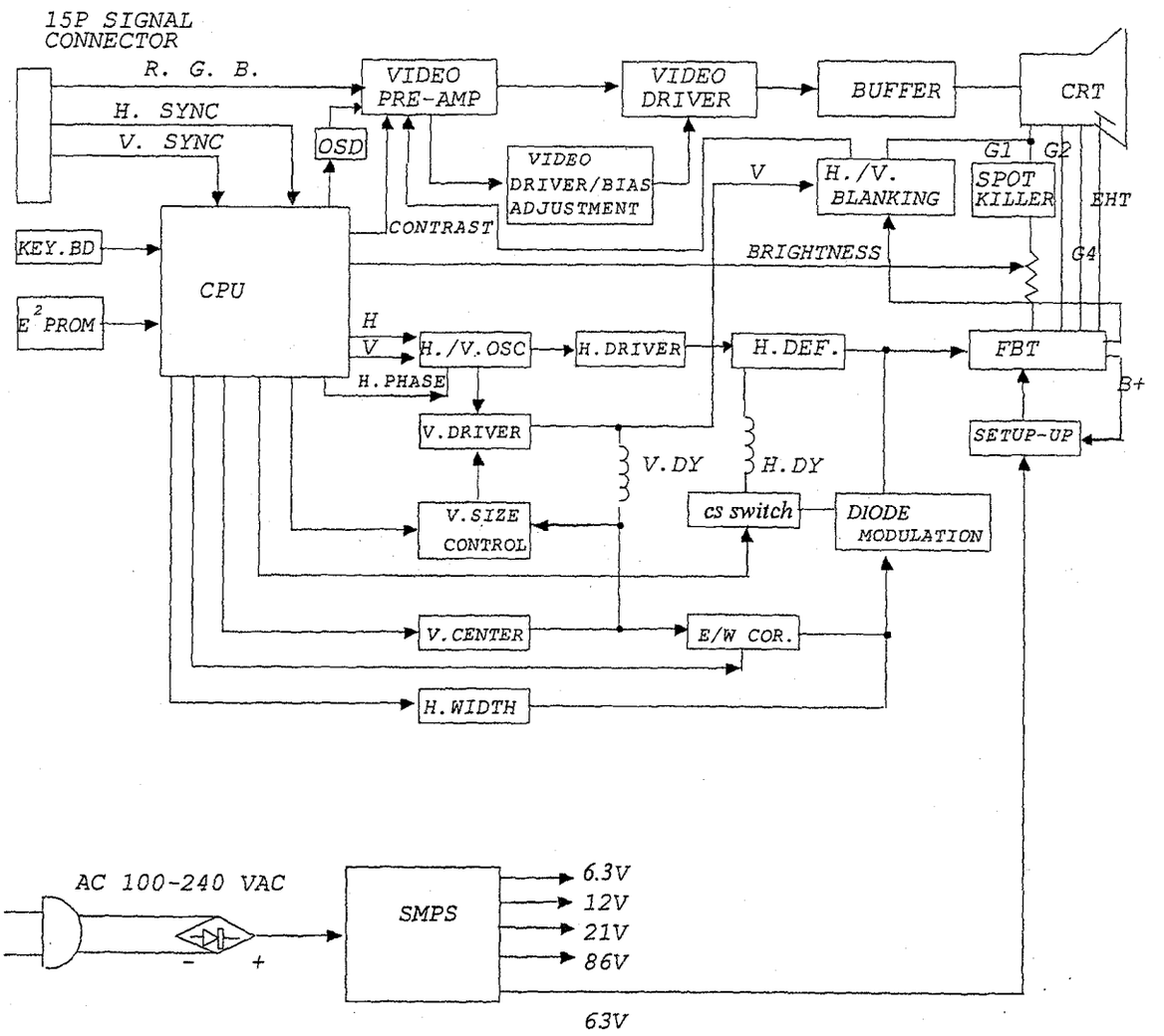
CRT Drive Components

BLOCK DIAGRAM

1. POWER SUPPLY BLOCK DIAGRAM



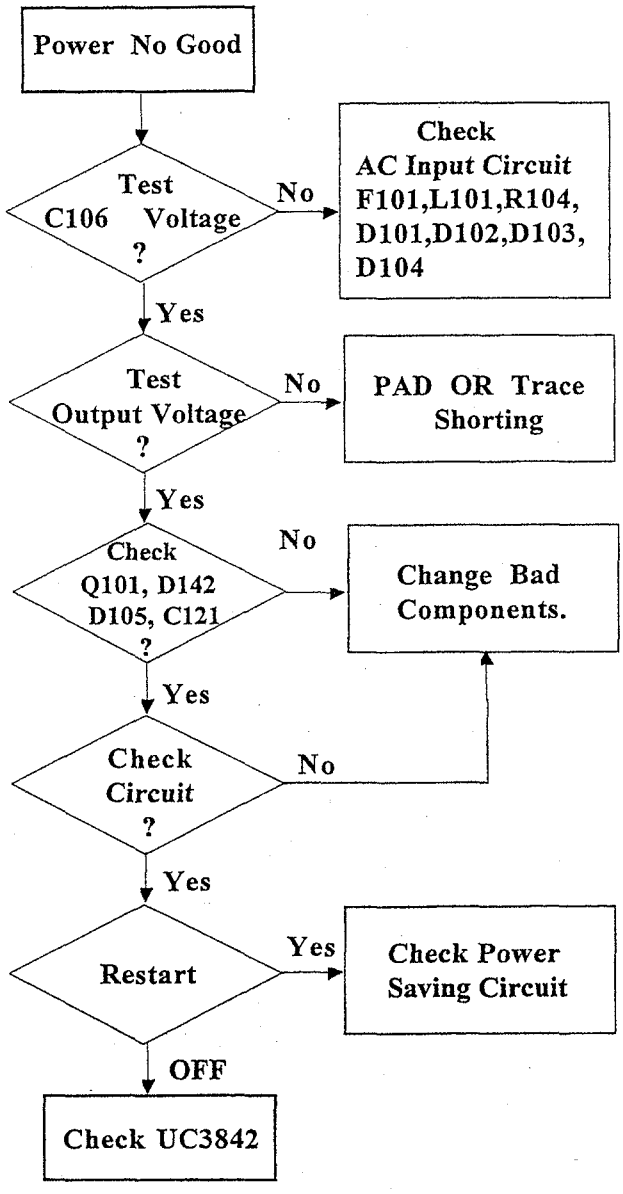
2. MAIN CIRCUIT BLOCK DIAGRAM



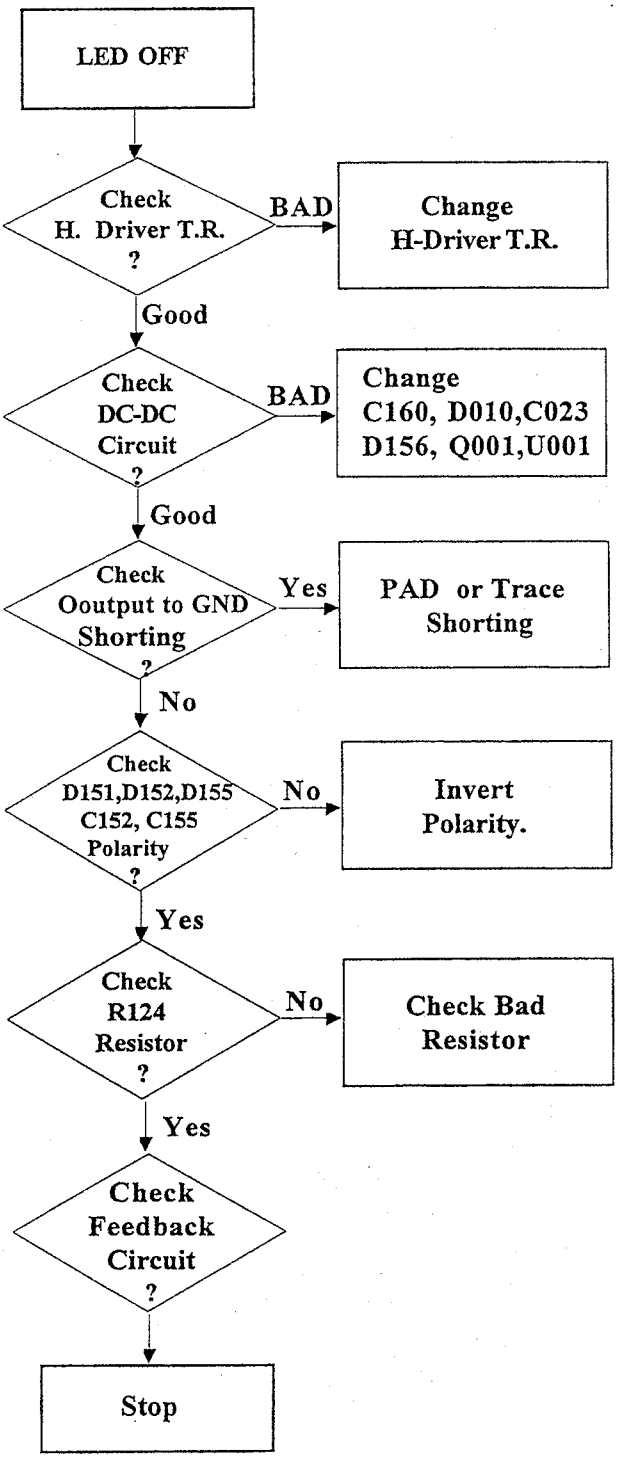
TROUBLE SHOOTING CHART

A. POWER SUPPLY CIRCUITS

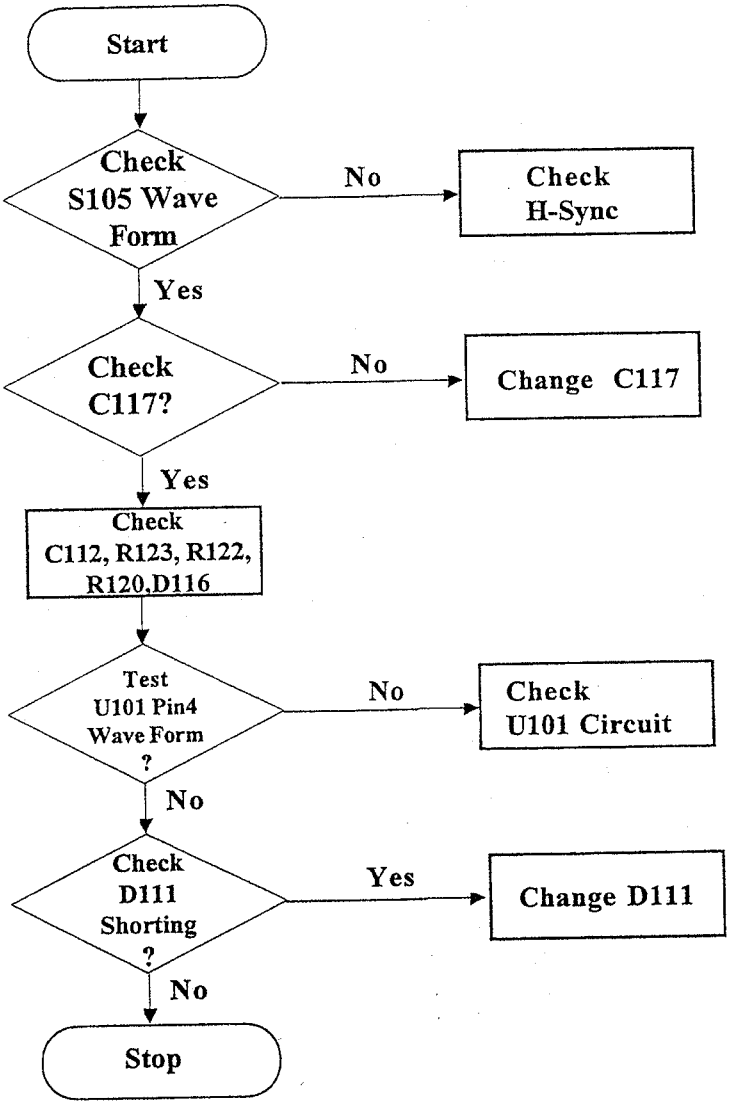
a. POWER NO GOOD



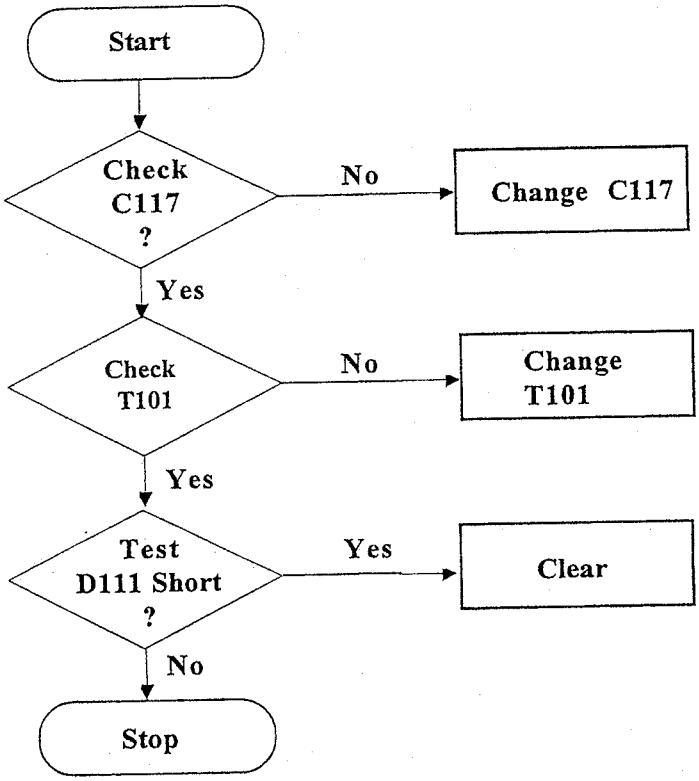
b. LED OFF


LED OFF
Check H. Driver T.R. ?
BAD
Change H-Driver T.R.
Good
Check DC-DC Circuit ?
BAD
Change C160, D010,C023 D156, Q001,U001
Good
Check Ooutput to GND Shorting ?
Yes
PAD or Trace Shorting
No
Check D151,D152,D155 C152, C155 Polarity ?
No
Invert Polarity.
Yes
Check R124 Resistor ?
No
Check Bad Resistor
Yes
Check Feedback Circuit ?
Stop

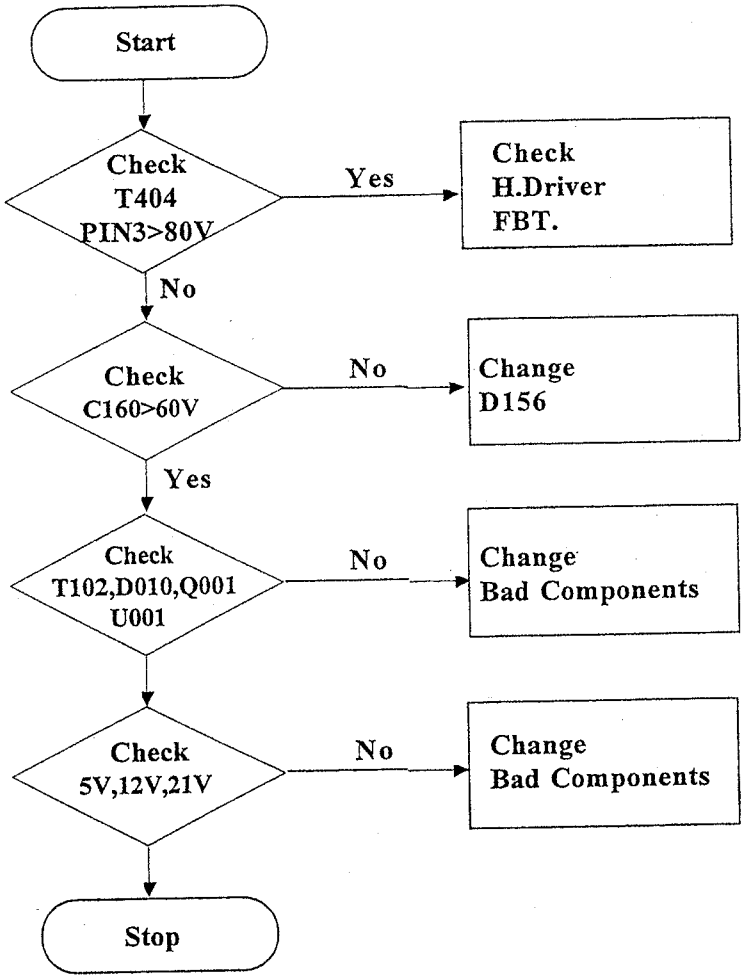
c. H-SYNC Interference



d. NOISE

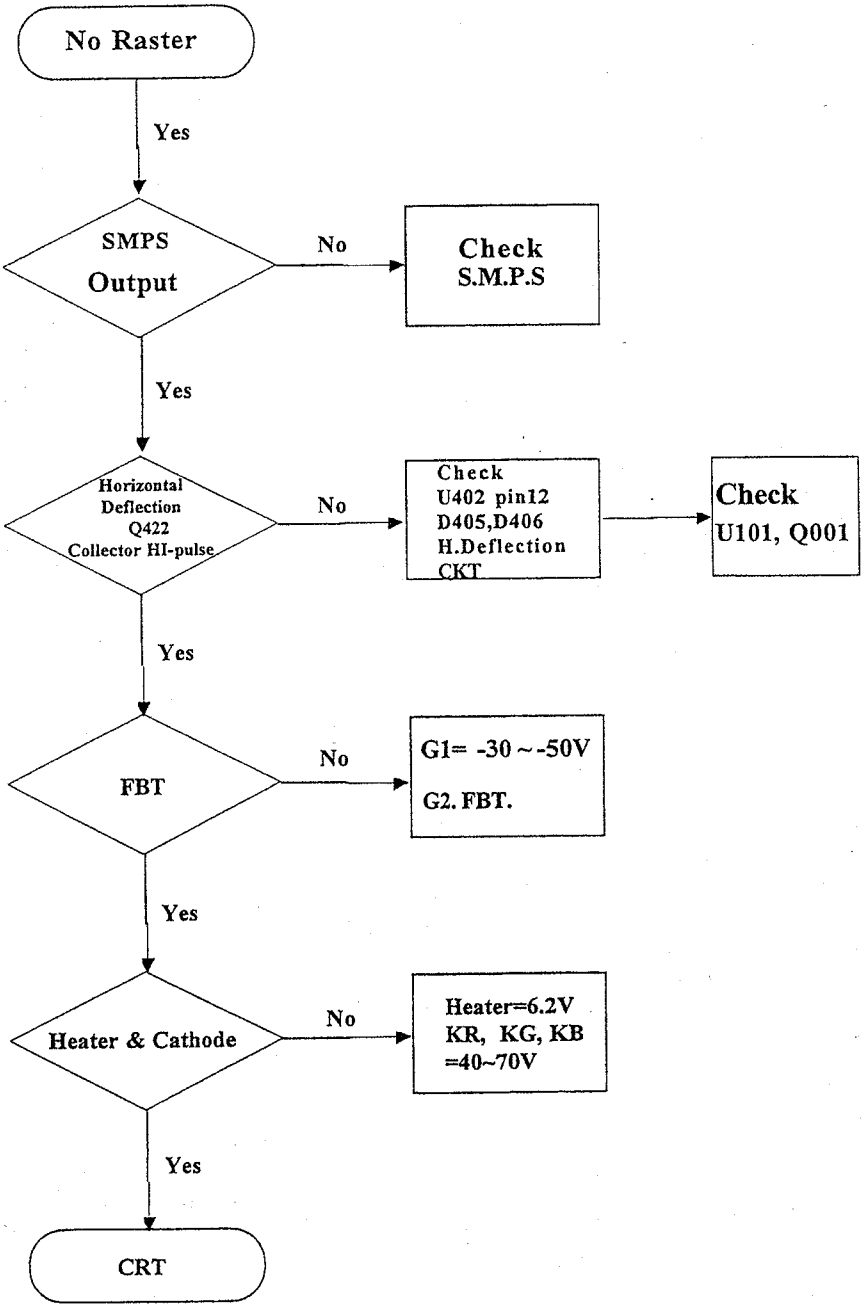

Start
Check C117 ?
No
Change C117
Yes
Check T101
No
Change T101
Yes
Test D111 Short ?
Yes
Clear
No
Stop

e. NO HIGH VOLATGE

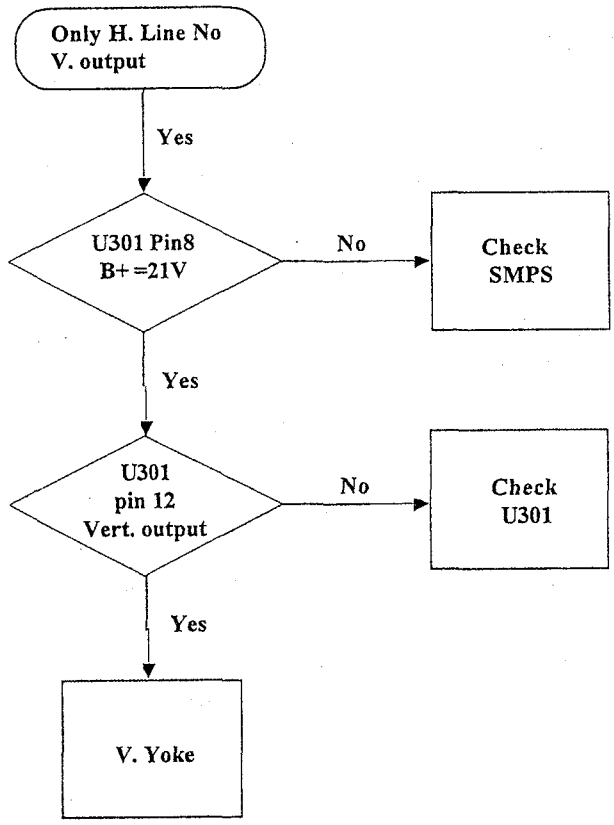


B. VIDEO CIRCUIT

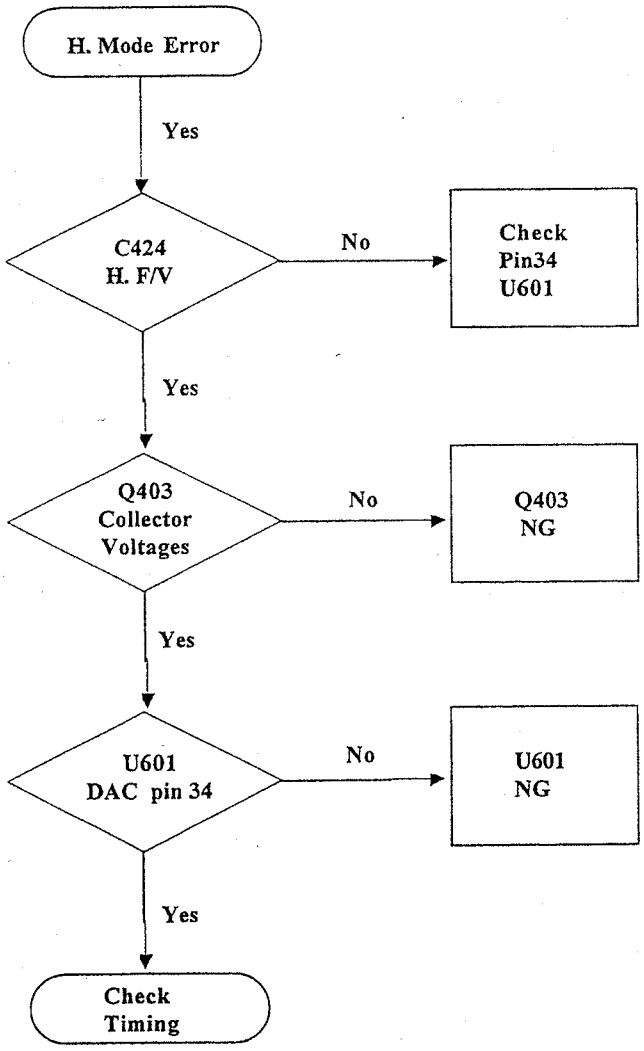
a. NO RASTER



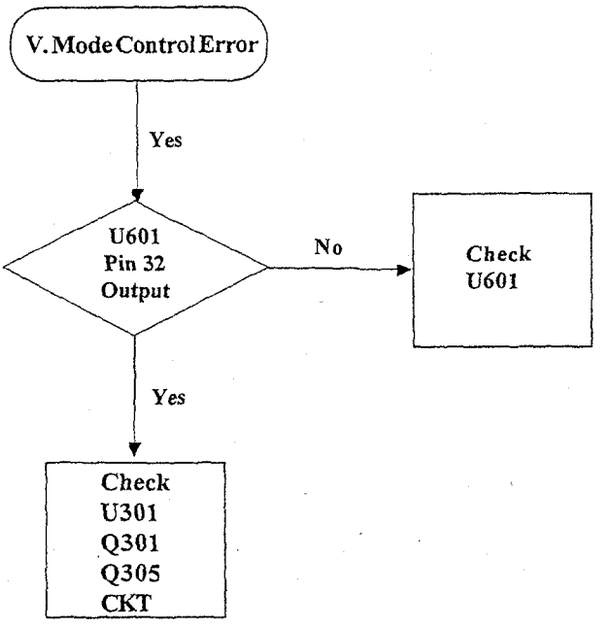
b. ONLY H. LINE NO V. OUTPUT



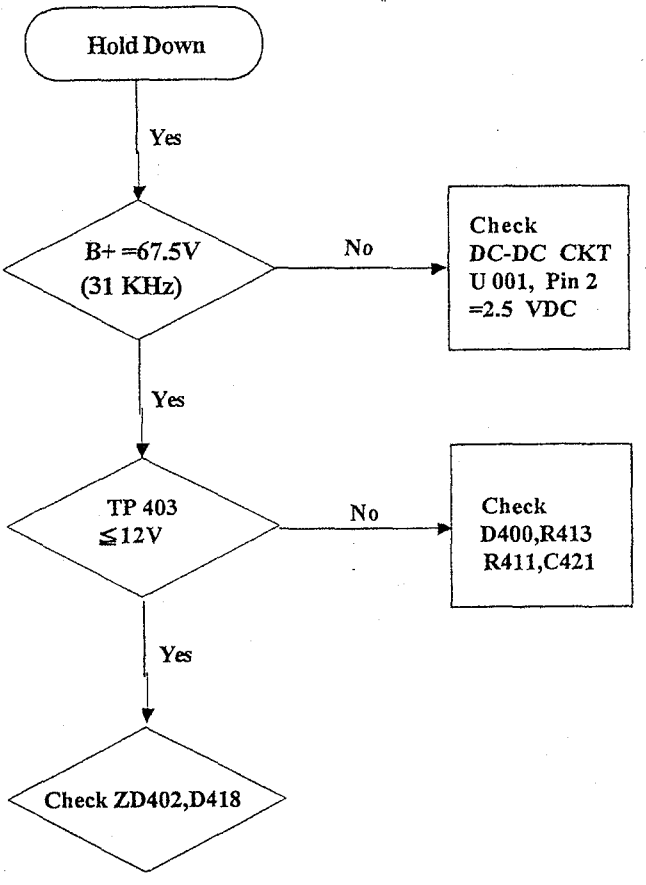
c. H. MODE ERROR



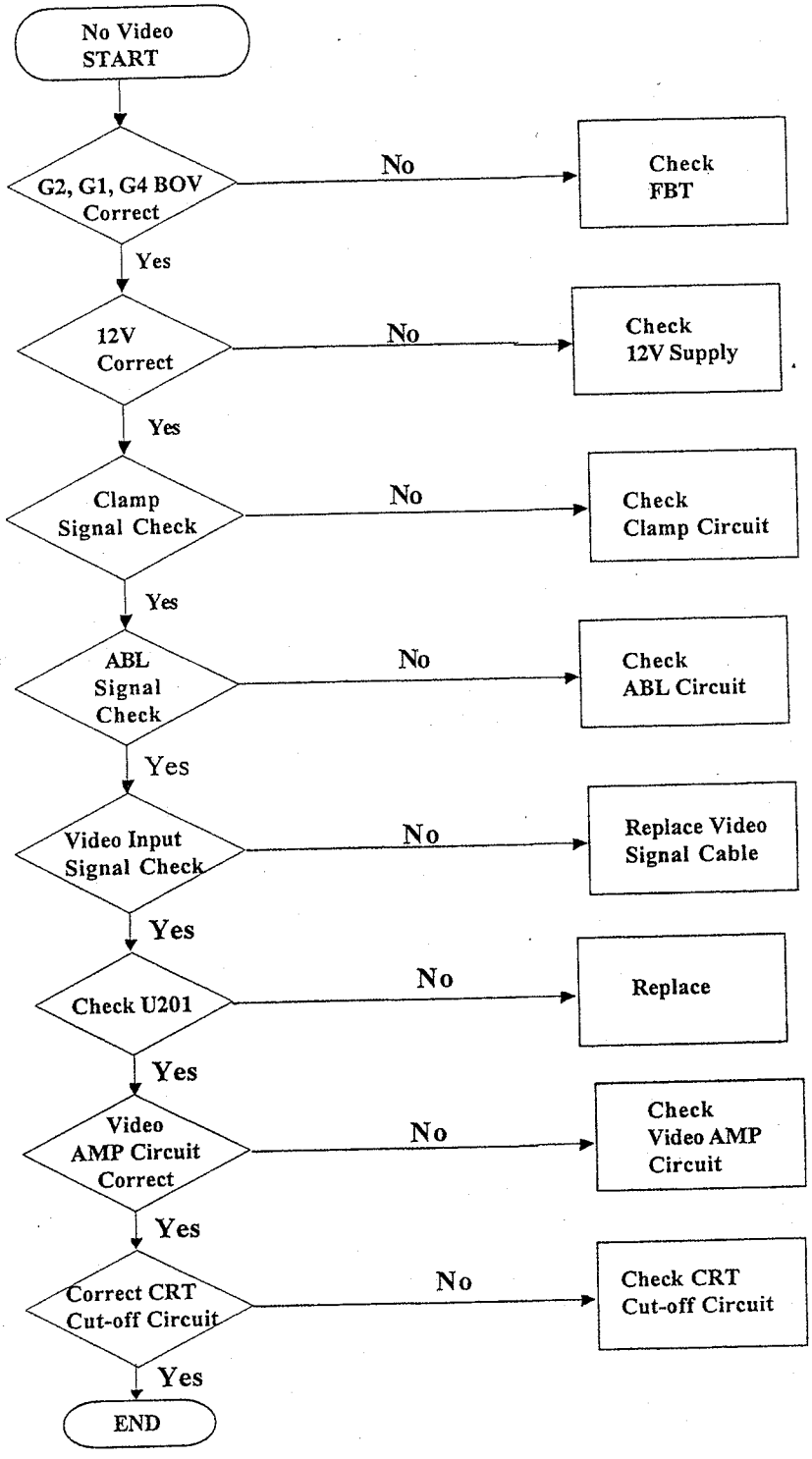
d. V. MODE CONTROL ERROR



e. HOLD DOWN

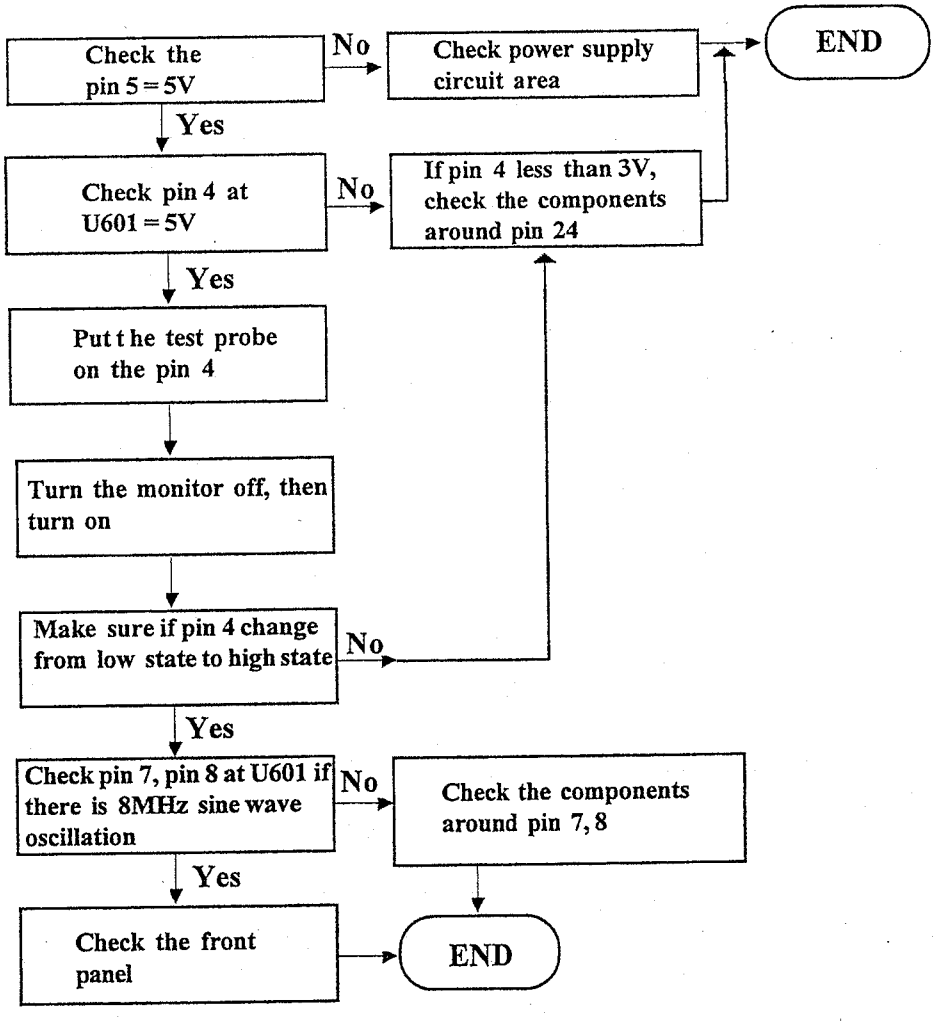

Hold Down
Yes
B+ =67.5V
(31 KHz)
No
Check
DC-DC CKT
U 001, Pin 2
=2.5 VDC
Yes
TP 403
≦12V
No
Check
D400,R413
R411,C421
Yes
Check ZD402,D418

f. NO VIDEO START



C. CPU Service Procedure
1. The CPU is malfunction.
2. The OSD is malfunction
3. The data message could not be stored by E2PROM
4. The CS signal from CPU is not working properly.
5. During mode change, there is a annoying picture appear on screen.

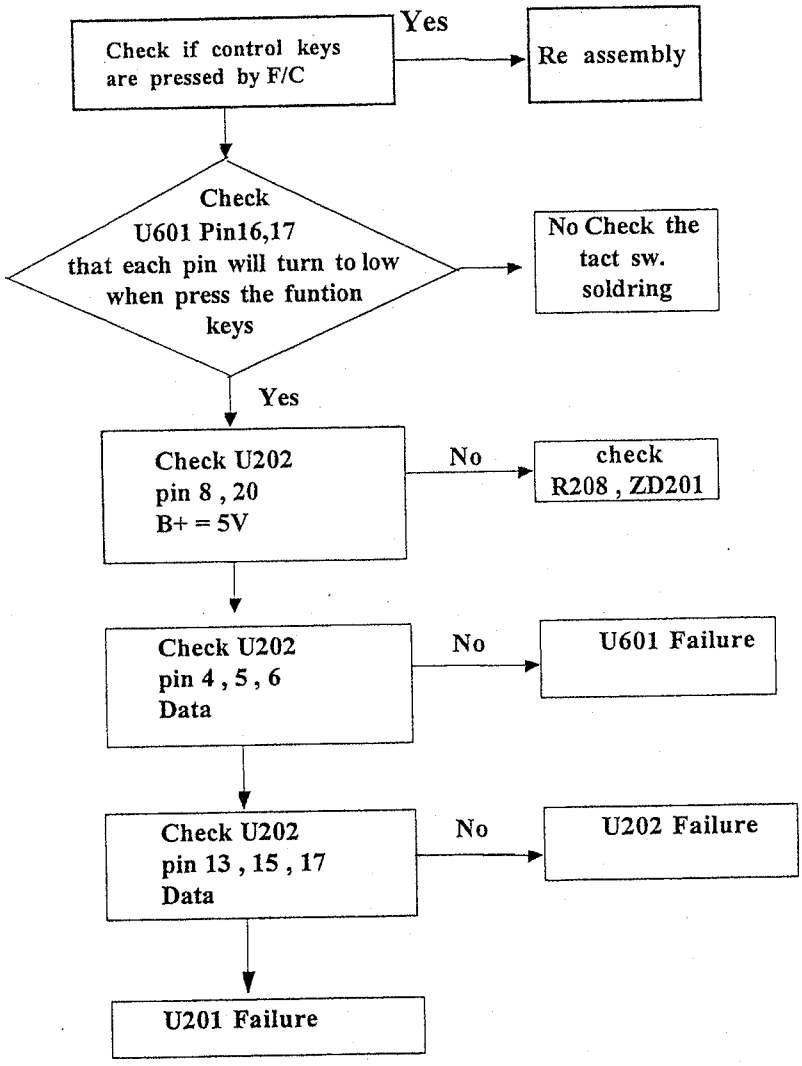
Solutions:
1. The CPU is malfunction


Check the pin 5 = 5V
No
Check power supply circuit area
END
Yes
Check pin 4 at U601 = 5V
No
If pin 4 less than 3V, check the components around pin 24
Yes
Put the test probe on the pin 4
Turn the monitor off, then turn on
Make sure if pin 4 change from low state to high state
No
Yes
Check pin 7, pin 8 at U601 if there is 8MHz sine wave oscillation
No
Check the components around pin 7, 8
Yes
Check the front panel
END

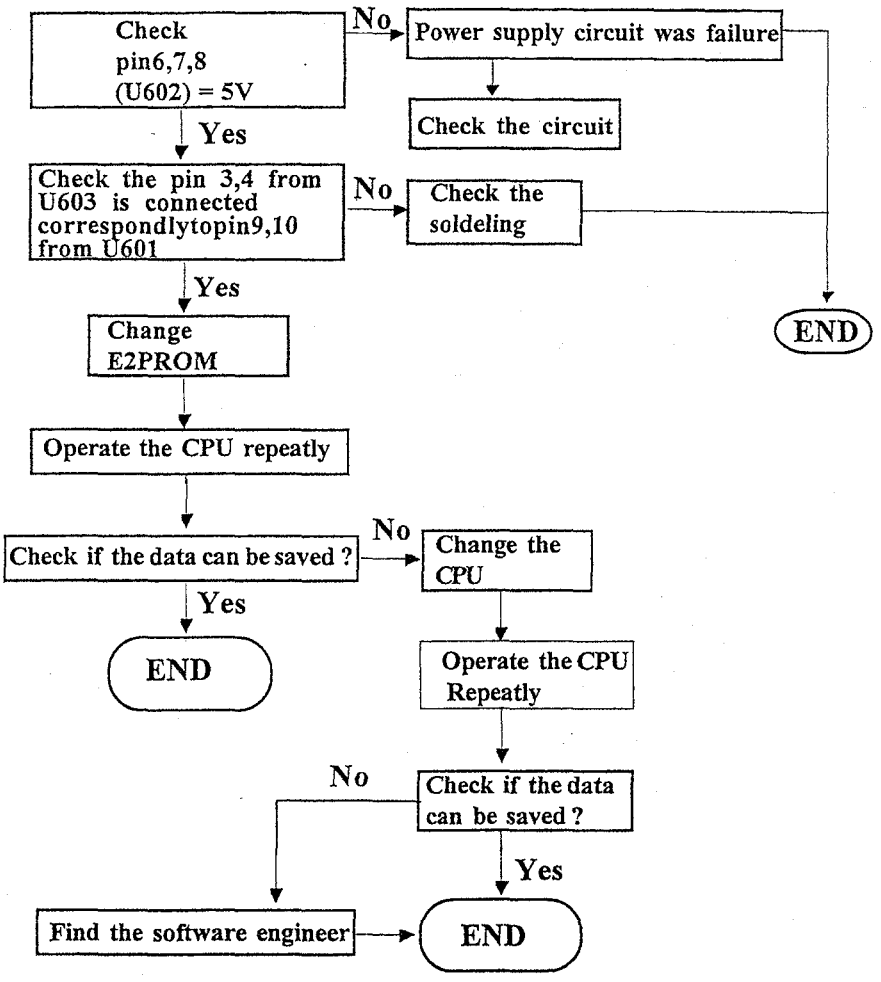
Note:

The CPU mal function is usually caused by the pin 4 not turning to low at power on (this step will initialize the CPU address to ZERO), and then pin 4 return to high state (at least 3V), for the CPU to operate normally.

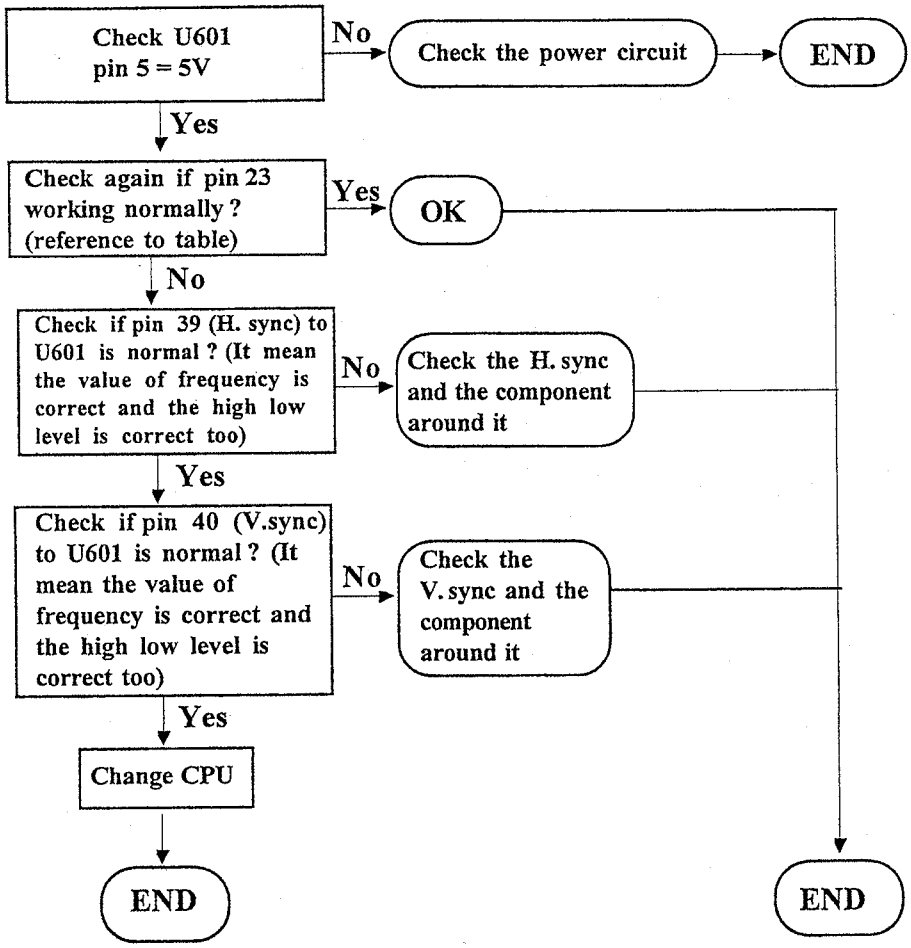
2. The OSD is malfunction


Check if control keys are pressed by F/C
Yes
Re assembly
Check U601 Pin16,17 that each pin will turn to low when press the funtion keys
No Check the tact sw. soldring
Yes
Check U202 pin 8 , 20 B+ = 5V
No
check R208 , ZD201
Check U202 pin 4 , 5 , 6 Data
No
U601 Failure
Check U202 pin 13 , 15 , 17 Data
No
U202 Failure
U201 Failure

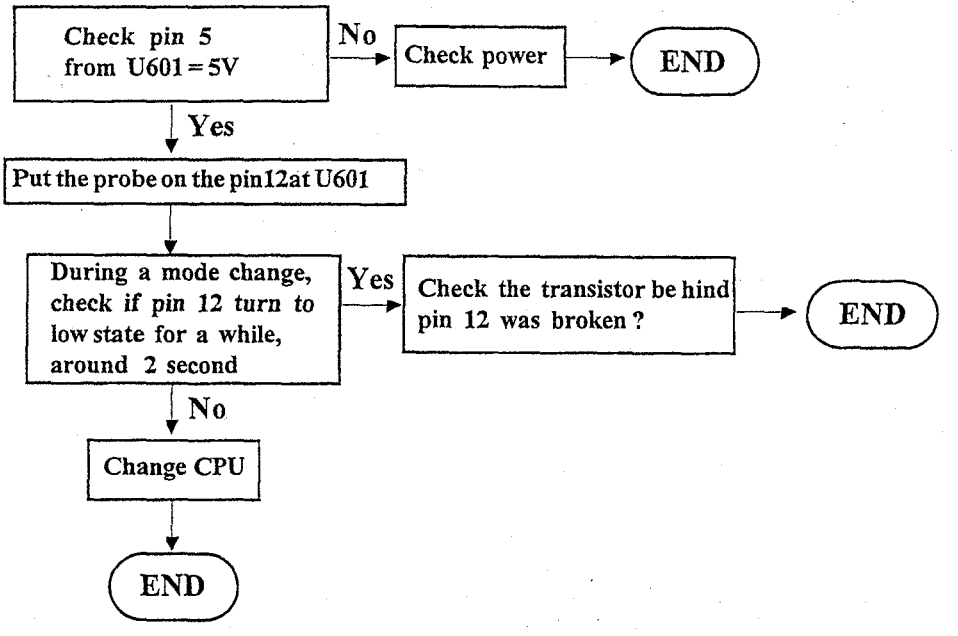
3. The data message could not be stored by E2 PROM



4. The CS signal from monitor is not working properly


Check U601 pin 5 = 5V
No
Check the power circuit
END
Yes
Check again if pin 23 working normally ? (reference to table)
Yes
OK
No
Check if pin 39 (H. sync) to U601 is normal ? (It mean the value of frequency is correct and the high low level is correct too)
No
Check the H. sync and the component around it
Yes
Check if pin 40 (V.sync) to U601 is normal ? (It mean the value of frequency is correct and the high low level is correct too)
No
Check the V. sync and the component around it
Yes
Change CPU
END
END

5. During mode change, there is a noise picture appear on screen


Check pin 5 from U601 = 5V
No
Check power
END
Yes
Put the probe on the pin12at U601
During a mode change, check if pin 12 turn to low state for a while, around 2 second
Yes
Check the transistor be hind pin 12 was broken ?
END
No
Change CPU
END

Note : Pin 12 from U601 is mute signal, active low.

SERVICE COMPONENTS

Warning: The components that have special important safety characteristics should be replaced only with identical types to those in the original circuit or specified in the parts list. Do not under estimate the safety of the display through improper service.

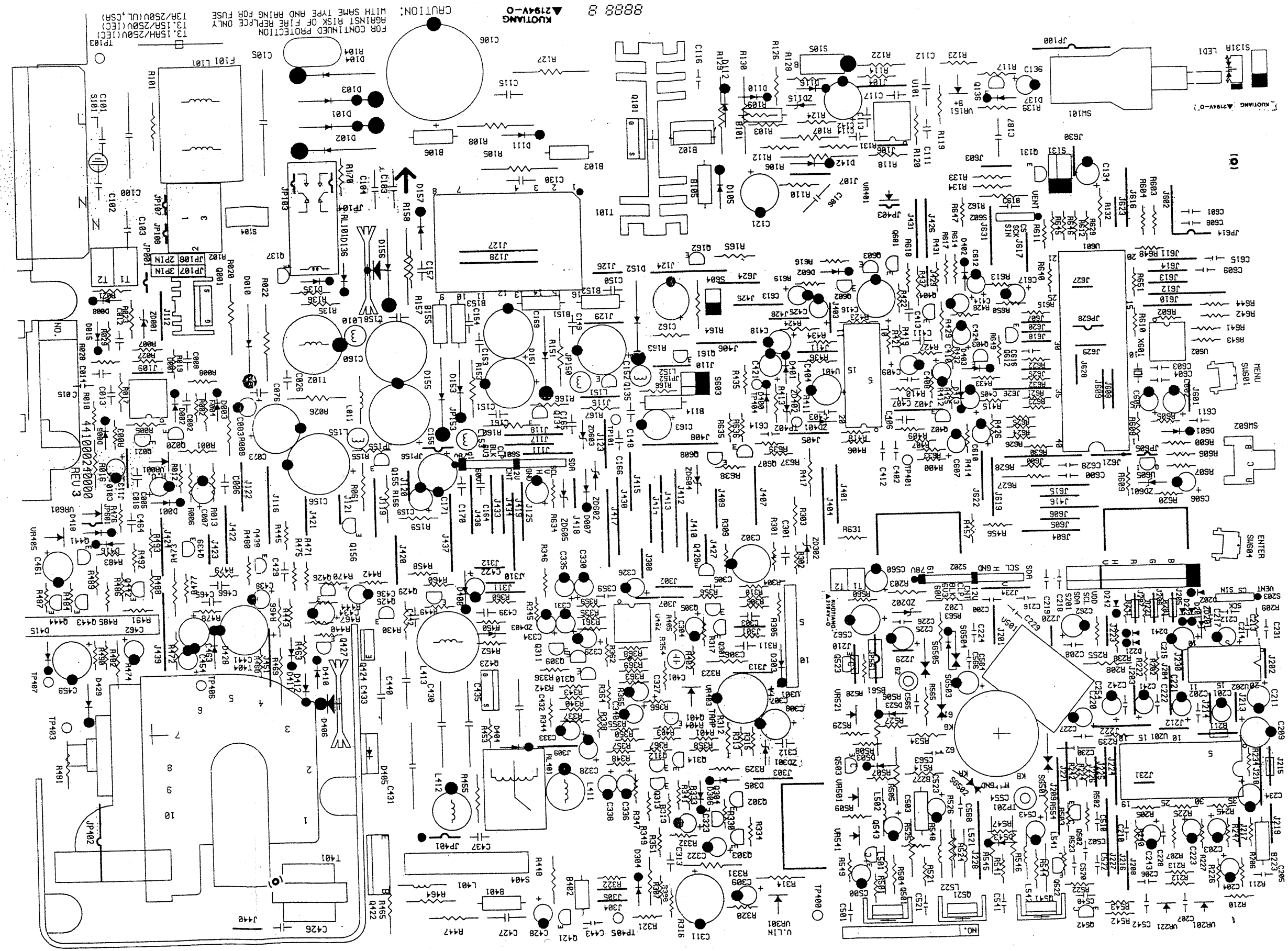
Abbreviations:

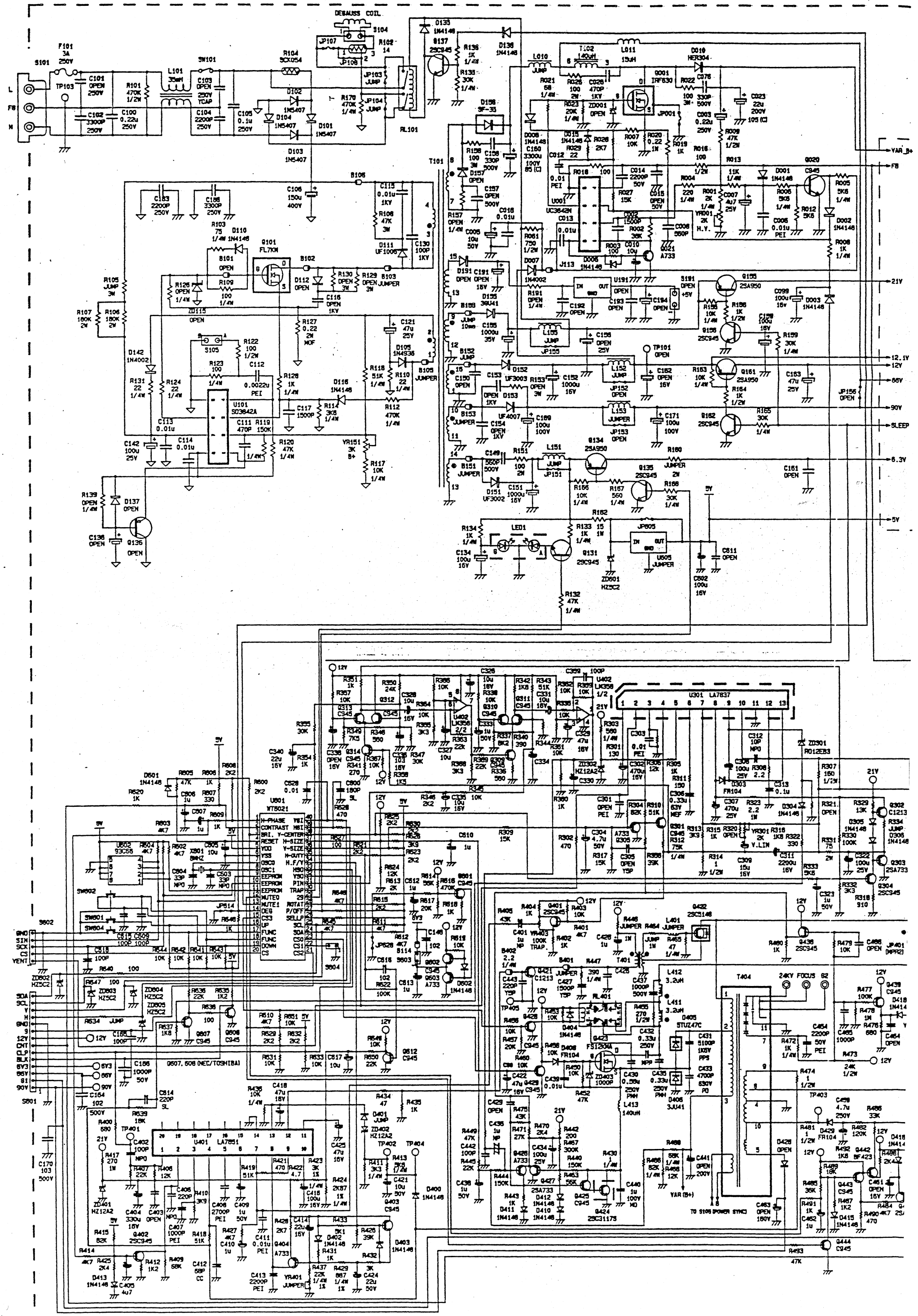
Capacitors:	CD	:	Ceramic Disc
	ELEC	:	Electrolytic
Resistors:	CF	:	Carbon Film
	MOF	:	Metal Oxide Film
	VR	:	Variable Resistor
	FU	:	Fusible
	MF	:	Metal Film

Allowance:

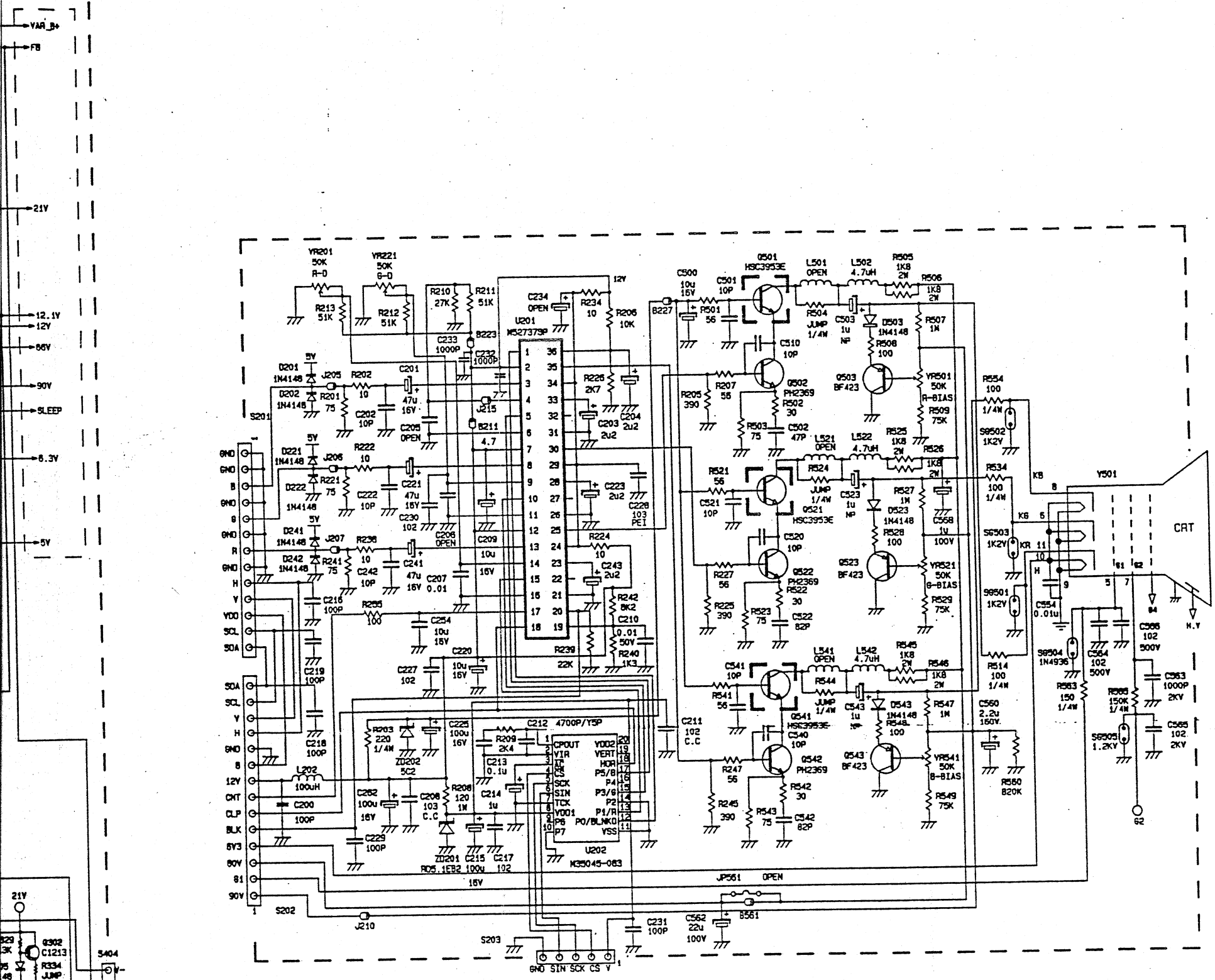
F ± 1%
G ± 2%
J ± 5%
K ± 10%
M ± 20%
P ± 100% - 0%
Z ± 80% - 20%

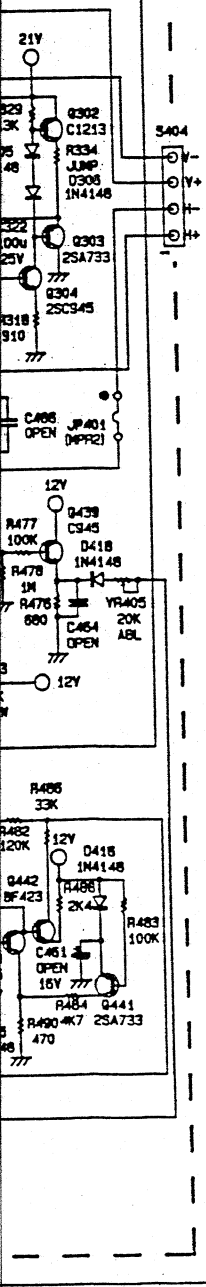
COMPONENT SIDE




DEGAUSS COIL
F101 3A 250V
S101
TP103
C101 OPEN 250V
C102 3300P 250V
C100 0.22u 250V
R101 470K 1/2W
L101 35mH
SW101
C103 OPEN 250V TCAP
C104 2200P 250V
C105 0.1u 250V
R104 SCK054
D102 1N5407
D104 1N5407
D101 1N5407
D103 1N5407
JP107
JP108
S104
R102 14
JP103 JUMP
JP104 JUMP
R170 470K 1/4W
RL101
D135 1N4148
Q137 2SC945
R136 1K 1/4W
R138 30K 1/4W
D136 1N4148
T102 140uH
L010 JUMP
L011 15uH
D010 HER304
Q001 IRF630
R021 68 1/4W
R026 100 2W
C026 470P 1KV
R022 100 3W
C075 330P 500V
C023 22u 200V
C003 0.22u 250V
R009 47K 1/2W
JP001
D158 SF-35
R158 100 3W
C158 330P 500V
D157 OPEN
C157 OPEN 500V
R157 OPEN 1/4W
C106 150u 400V
B106
C115 0.01u 1KV
R106 47K 3W
C130 100P 1KV
D111 UF1006
C183 2200P 250V
C186 3300P 250V
R103 75 1/4W
D110 1N4148
Q101 FL7K0M
B101 OPEN
R109 100 1/4W
B102
D112 OPEN
R130 OPEN 3W
R129 OPEN 3W
B103 JUMPER
C116 OPEN 1KV
R126 OPEN 1/4W
ZD115 OPEN
R105 JUMP 3W
R107 180K 2W
R106 180K 2W
D142 1N4002
R131 22 1/4W
R124 22 1/4W
S105
R122 100 1/2W
R123 100 1/4W
C112 0.0022u PEI
R127 0.22 2W MOF
R128 1K 1/4W
D116 1N4148
C117 1500P
R114 3K6 1/4W
C121 47u 25V
D105 1N4936
R118 51K 1/4W
R110 22 1/4W
R112 470K 1/4W
B105 JUMPER
U101 S03842A
C113 0.01u
C111 470P
R119 150K
R120 47K 1/4W
C142 100u 25V
C114 0.01u
YR151 3K
R117 10K 1/4W
R139 OPEN 1/4W
D137 OPEN
C136 OPEN
Q136 OPEN
T101
R061 750 1/2W
C006 10u 50V
C016 0.01u
C013 0.01u
C002 1500P
R002 36K
C008 560P
R003 100
C010 10u
Q021 A733
D006 1N4148
J113
D007 1N4002
U001 UC3842N
R027 15K
C015 OPEN 50V
R007 10K
R020 0.22 1W
R019 1K
R016 100
R013 11K 1/4W
Q020
D001 1N4148
C945
R004 220 1/4W
R001 2K 1/4W
C007 4u7 25V
YR001 2K H.V.
R012 5K6
R005 5K6 1/4W
R006 5K6 1/4W
C006 0.01u PEI
D002 1N4148
R008 1K 1/4W
D008 1N4148
C160 3300u 100V 85(C)
D015 1N4148
R029 2K7
C012 22
R023 20K 1/4W
ZD001 OPEN
R021 68 1/4W
D191 OPEN
C191 OPEN 16V
C192 OPEN
U191
IN OUT GND
C193 OPEN
C194 OPEN
S191 OPEN +5V
Q155 2SA950
R155 10K 1/4W
R156 1K 1/2W
Q156 2SC945
C099 100u 16V
D003 1N4148
C158 100u 16V
R159 30K 1/4W
D155 30U41
C155 1000u 35V
L155 JUMP JP155
C156 OPEN 25V
TP101 OPEN
B152 JUMP
D152
C153 UF3003
R153 OPEN 3W
C152 1000u 16V
L152 JUMP JP152 OPEN
C162 OPEN 16V
C150 OPEN
R163 10K 1/4W
Q161 2SA950
R164 1K 1/2W
C163 47u 25V
JP156 OPEN
B153 JUMPER
C154 OPEN 1KV
UF4007
C169 100u 100V
L153 JUMPER JP153 OPEN
C171 100u 100V
Q162 2SC945
R165 30K 1/4W
B151 JUMPER
C149 550P 500V
D151 UF3002
C151 1000u 16V
R151 100 2W
L151 JUMP JP151
Q134 2SA950
R166 10K 1/4W
R167 560 1/4W
Q135 2SC945
R168 30K 1/4W
R160 JUMPER 2W
C161 OPEN
R162
R134 1K 1/4W
LED1
C134 100u 16V
R133 15 1W
R131 1K 1/4W
Q131 2SC945
JP605
U505 JUMPER
ZD601 HZ5C2
C811 OPEN
C802 100u 16V
R132 47K 1/4W
5V
VAR_B+
FB
21V
12.1V
12V
8.6V
9.0V
SLEEP
8.3V
5V
U301 LA7837
U402 LM358 1/2
U402 LM358 2/2
C326 10u 16V
C359 100P
R351 1K
R350 24K
R357 10K
Q312
Q313
C945
C328 10u 16V
R364 10K
R365 3K3
R366 10K
R342 1K8
R343 51K
C331 10u 16V
R362 10K
R359 10K
R338 10K
Q310
Q311
R336 10K
R349 7K5
R346 560
R347 30K
R348 390
R337 8K2
R340 390
R344
R361 10K
C329 47u 16V
R303 560 1/4W
R301 130
C303 0.01 PEI
C312 10P NPO
ZD301 RD12EB3
C306 100u 25V
R308 2.2
D303 FR104
C313 0.1u
R307 150 1/2W
C336 OPEN 16V
C338 103 16V
C339 103 16V
R358 1K5
R355 30K
C340 22u 16V
R354 1K
R363 22K
C327 10u
R368 3K3
R369 22K
R339 30K
R335 10K
C335 10u 16V
R345
R346 2K2
C334
ZD302 HZ12A2
C330
R360 1K
C301 OPEN PEI
R304 82K
R310 51K
C302 470u 16V
R305 12K
R311 150
C305 0.33u 63V MEF
R309 15K
C310
R302 470
C304 4.7u 50V
A733
Q305
R312 75K
Q301 C945
R313 3K3
R315 1K
R320 OPEN
YR301 2K V.LIN
R316 1K8
R322 330
C309 15u 16V
C311 2200u 16V
R314 1 1/2W
R306 39K
R317 15K
C305 OPEN Y5P
R333 5K6
C322 100u 25V
Q303 2SA733
R332 3K3
R318 910
C323 1u 50V
R329 13K
Q302 C1213
R334 JUMP
D306 1N4148
D305 1N4148
R330 100K
Q304 2SC945
C307 470u 25V
R323 2.2 1W
D304 1N4148
R321 OPEN
R331 75 2W
C313 0.1u
C161 OPEN
C163 47u 25V
C164 102 500V
S601
C165 1000P 50V
C814 220P SL
C170 103 500V
R639 18K
R634 JUMP
C166 100P
ZD602 HZ5C2
ZD603 HZ5C2
ZD604 HZ5C2
ZD605 HZ5C2
R647 100
R635 1K2
R636 22K
R637 1K8
R638 100
Q606 C945
Q607, 608 (NEC/TOSHIBA)
R640 100
R644 10K
R642 10K
R641 10K
R643 10K
R645 4K7
R646 4K7
R648 1K
C515 100P
C509 100P
C518 100P
SW602
SW601
SW604
JP614
S602
GND
SIN
SCK
CS
YENT
SDA
SCL
V
H
GND
9
12V
CNT
CLP
BLK
8V3
8.6V
9V
9.0V
S1
U601 MT5021
U602 93C66
X601 8MHZ
C604 33P NPO
C603 33P NPO
C605 10u
R604 4K7
R602 4K7
R603 4K7
R601 100
R600 2K2
R608 2K2
R605 47K
R606 1K
D601 1N4148
R620 1K
C606 1u
R607 330
C607 1u
R609 1K
C608 0.01
C609 180P 5L
R628 470
R625 2K2
R630 3K9
R626 3K9
R627 2K2
R624 12K
R623 2K2
R622 100K
C622 102
C613 1u
R621 2K2
R614 56K
R616 470K
R615 2K2
R617 20K
R618 1K
R611 4K7
R612 4K7
R613 2K
C612 1u
C614 102
C615 9603
C616 9602
C617 9603
C618 9603
Q614 C945
Q615 C945
Q616 C945
Q617 A733
D602 1N4148
C146 102
R619 470K
R610 4K7
R651 10K
R629 2K2
R632 2K2
R631 10K
R633 10K
C617 10u
R650 22K
Q612 C945
R649 10K
C418 47u 16V
R436 10K 1/4W
R435 1K
R434 47
D401 JUMP
ZD402 HZ12A2
TP402
TP404
C425 47u 16V
R413 5K6 1/4W
C421 10u 50V
Q403 C945
D400 1N4148
U401 LA7851
C402 100P NPO
R417 270 1W
R407 22K
R406 12K
R419 51K
R421 470
R422 4.7
R423 3K 1%
1/4W C418 100u 16V
R424 2K87 1%
1/4W
ZD401 HZ12A2
C404 330u 16V
C403 OPEN
C406 220P NPO
C407 1000P PEI
R410 3K9
R418 51K
C408 2700P PEI
C409 1u 50V
R427 4K7
C410 1u
R428 2K7
C414 22u 16V
R433 5K1 1/4W
Q402 1N4148
R431 1K
R426 39K
R432 3K
C424 22u 50V
D403 1N4148
Q404 A733
R437 22K 1/4W 1%
R429 887 1/4W 1%
C413 2200P PEI
YR401 JUMPER
C411 0.01u PEI
R415 82K
Q402 2SC945
R414 4K7
R425 2K4
R412 1K2
R409 68K
C412 68P CC
D413 1N4148
C405 4u7
R639 18K
C402 100P NPO
R417 270 1W
R407 22K
R406 12K
C406 220P NPO
C407 1000P PEI
R410 3K9
R418 51K
C408 2700P PEI
C409 1u 50V
R427 4K7
C410 1u
R428 2K7
C414 22u 16V
R433 5K1 1/4W
Q402 1N4148
R431 1K
R426 39K
R432 3K
C424 22u 50V
D403 1N4148
Q404 A733
R437 22K 1/4W 1%
R429 887 1/4W 1%
C413 2200P PEI
YR401 JUMPER
C411 0.01u PEI
R415 82K
Q402 2SC945
R414 4K7
R425 2K4
R412 1K2
R409 68K
C412 68P CC
D413 1N4148
C405 4u7
D401 1N4148
D411 1N4148
D412 1N4148
D410 1N4148
D415 1N4148
D409 1N4148
C421 10u 50V
R411 3K3 1/4W
R412 5K6 1/4W
C422 47u 16V
Q429 C945
C439 0.01u
R452 47K
C430 0.56u 250V PMH
C435 0.33u 250V PMH
C433 4700P 630V PO
D406 3JU41
L413 140uH
C429 OPEN
C436 1u NP
R475 43K
R471 27K
R470 2K4
R442 200
R457 300K
R440 150K
R430 1/4W
R444 150K
R463 56K
C440 1u 100V MO
C438 1u 50V
R449 47K
C442 100P
R445 22K
Q427 2SA733
Q424 2SC3117S
Q425 C945
R443 1K
R468 68K 1/4W
R466 82K 1/4W
R467 12K
C441 OPEN 200V
D426 OPEN
C463 OPEN 150V
TO S106 (POWER SYNC)
YAR (B+)
T404
24KV FOCUS G2
L412 3.2uH
L411 3.2uH
D405 5TUZ47C
C431 5100P 1KV PPS
C432 0.33u 250V
C434 100u 25V
C427 1500P Y5P
C437 1000P 500V
RL401
R455 270 1/2W
R456
R457 20K
R458 10K
D408 FR104
R460 10K
R450 10K
ZD403 1000P
C433 4700P 630V PO
R452 47K
C439 0.01u
C430 0.56u 250V PMH
C435 0.33u 250V PMH
D406 3JU41
L413 140uH
C429 OPEN
C436 1u NP
R475 43K
R471 27K
R470 2K4
R442 200
R457 300K
R440 150K
R430 1/4W
R444 150K
R463 56K
C440 1u 100V MO
C438 1u 50V
R449 47K
C442 100P
R445 22K
Q427 2SA733
Q424 2SC3117S
Q425 C945
R443 1K
R468 68K 1/4W
R466 82K 1/4W
R467 12K
C441 OPEN 200V
D426 OPEN
C463 OPEN 150V
TO S106 (POWER SYNC)
YAR (B+)
R404 1K
Q401 2SC945
R403 10K
R405 43K
C401 1u NP
YR403 100K TRAP.
R402 1K
R401 4K7
C426 1u
R446 JUMPER
R464
L401 JUMPER
Q422 2SC5148
B402 2.2 1/4W
B401
R447 390 1/4W
T401
C443 220P Y5P
C421 C1213
C428
L412 3.2uH
L411 3.2uH
TP405
RL401
R453 10K
R454 10K
R456
R457 20K
C945
R460
C422 47u 16V
Q429 C945
C439 0.01u
R452 47K
C430 0.56u 250V PMH
C435 0.33u 250V PMH
C433 4700P 630V PO
D406 3JU41
L413 140uH
C429 OPEN
C436 1u NP
R475 43K
R471 27K
R470 2K4
R442 200
R457 300K
R440 150K
R430 1/4W
R444 150K
R463 56K
C440 1u 100V MO
C438 1u 50V
R449 47K
C442 100P
R445 22K
Q427 2SA733
Q424 2SC3117S
Q425 C945
R443 1K
R468 68K 1/4W
R466 82K 1/4W
R467 12K
C441 OPEN 200V
D426 OPEN
C463 OPEN 150V
TO S106 (POWER SYNC)
YAR (B+)
T404
24KV FOCUS G2
L412 3.2uH
L411 3.2uH
D405 5TUZ47C
C431 5100P 1KV PPS
C432 0.33u 250V
C434 100u 25V
C427 1500P Y5P
C437 1000P 500V
RL401
R455 270 1/2W
R456
R457 20K
R458 10K
D408 FR104
R460 10K
R450 10K
ZD403 1000P
C433 4700P 630V PO
R452 47K
C439 0.01u
C430 0.56u 250V PMH
C435 0.33u 250V PMH
D406 3JU41
L413 140uH
C429 OPEN
C436 1u NP
R475 43K
R471 27K
R470 2K4
R442 200
R457 300K
R440 150K
R430 1/4W
R444 150K
R463 56K
C440 1u 100V MO
C438 1u 50V
R449 47K
C442 100P
R445 22K
Q427 2SA733
Q424 2SC3117S
Q425 C945
R443 1K
R468 68K 1/4W
R466 82K 1/4W
R467 12K
C441 OPEN 200V
D426 OPEN
C463 OPEN 150V
TO S106 (POWER SYNC)
YAR (B+)
R493 47K
Q444 C945
R481 1 1/2W
D429 FR104
R482 120K
R492 1K8
Q442 BF423
R488 18K
R485 36K
R491 1K
C452 1u
R487 1K2
D415 1N4148
R490 4K7
R484 470
C461 OPEN 16V
R486 33K
C459 4.7u 250V
C458 OPEN
TP403
R474 1 1/2W
R473 24K 1/2W
R472 1K 1/4W
C464 2200P 50V PEI
C465 1000P
R476 680
R478 1M
R477 100K
Q439 C945
D418 1N4148
C464 OPEN
12V
21V
5V

441000240000 MAIN PCB REV.	DATE
3	04-21-'99
3	11-08-'99





NOTE:
1. THE UNIT OF RESISTANCE ' OHM ' IS OMITTED (K-1000 OHMS AND M-1MEG OHMS)
2. ALL RESISTORS ARE ' 1/8 W ' AND ' 5% ' UNLESS OTHERWISE NOTED.
3. ALL CAPACITORS RATING ARE ' 50V ' UNLESS OTHERWISE NOTED.
4. ALL VRIBLE RESISTOR ARE ' 0.1W ' AND ' 6 MIN 'UNLESS OTHERWISE NOTED.
3. ALL ELECTROLYTIC CAPACITORS RATING ARE ' 85 DEGREE C ' UNLESS OTHERWISE NOTED.
6. (C): DEGREE C

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APPROVALS		DATE
DRAWN	L. S. HO	11-08-'99
CHECKED	Tom Wu	11-08-'99
ISSUED		11-08-'99
MANAGER		11-08-'99

PCAD FILE : T05M8A.SCH

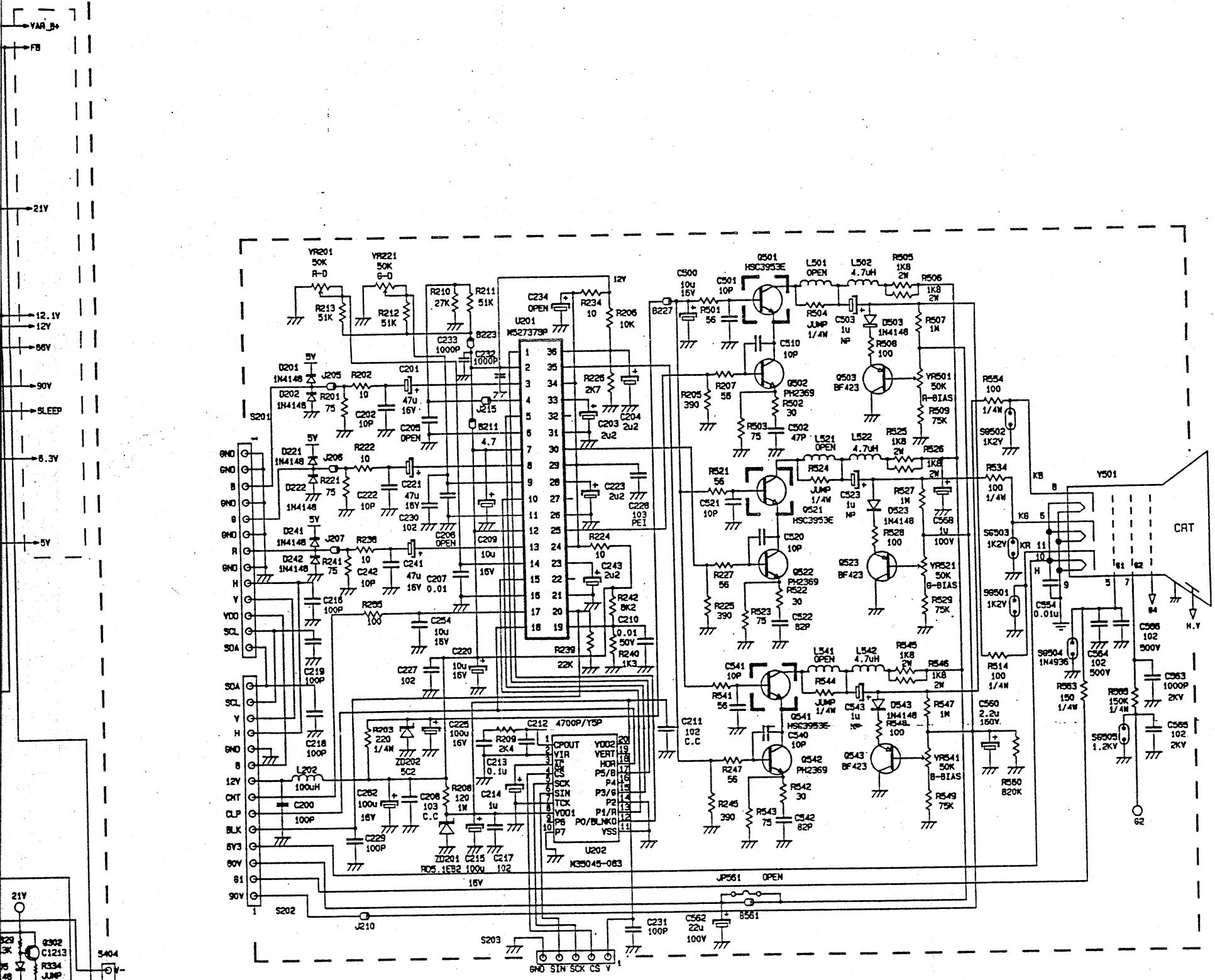
102030

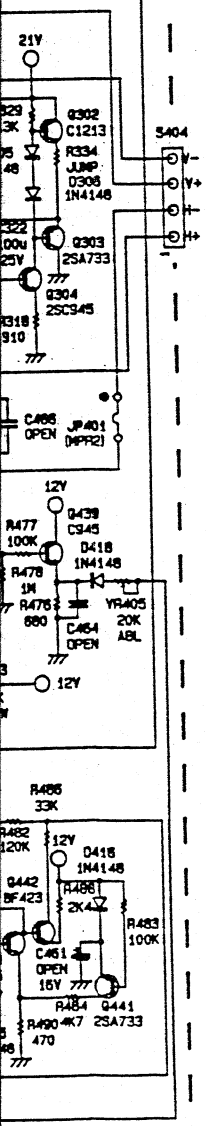
T05

MAIN BD & CRT BD SCHEMATIC

SIZE	MODEL	DWG. NO.	REV.
A1	10 20 30	540010340100	1.0
SCALE	E/PCO NO. E-007	SHEET 1 OF 1	

441000240000 MAIN PCB REV.	DATE
3	04-21-'99
3	11-08-'99





NOTE:
1. THE UNIT OF RESISTANCE ' OHM ' IS OMITTED (K-1000 OHMS AND M-1MEG OHMS)
2. ALL RESISTORS ARE ' 1/8 W ' AND ' 5% ' UNLESS OTHERWISE NOTED.
3. ALL CAPACITORS RATING ARE ' 50V ' UNLESS OTHERWISE NOTED.
4. ALL VRIBLE RESISTOR ARE ' 0.1W ' AND ' 6 MIN 'UNLESS OTHERWISE NOTED.
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6. (C): DEGREE C

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ISSUED		11-08-'99
MANAGER		11-08-'99

PCAD FILE : T05M8A.SCH

102030

T05

MAIN BD & CRT BD SCHEMATIC

SIZE	MODEL	DWG. NO.	REV.
A1	10 20 30	540010340100	1.0
SCALE	E/PCO NO. E-007	SHEET 1 OF 1	